DOCUMENT RESUME

ED 435 848 CE 079 442

TITLE Research Fresh from Florida. Proceedings of the National Agricultural Education Research Conference (26th, Orlando, Florida, December 11, 1999).
INSTITUTION American Association for Agricultural Education.
PUB DATE 1999-12-11
NOTE 647p.
PUB TYPE Collected Works - Proceedings (021) -- Reports - Research (143)
EDRS PRICE MF03/PC26 Plus Postage.
DESCRIPTORS Academic Achievement; Accountability; Adult Education; *Agricultural Education; Agricultural Production; Career Change; Career Choice; Charter Schools; Computer Uses in Education; *Curriculum Development; Dropouts; Economic Impact; Educational Change; *Educational Improvement; Educational Needs; *Educational Research; Elementary Secondary Education; Extension Education; Graduate Surveys; Higher Education; Integrated Curriculum; Internship Programs; Longitudinal Studies; Majors (Students); Models; Multivariate Analysis; Outcomes of Education; Pretests Posttests; Program Development; Program Implementation; Rural Education; School Community Relationship; School Holding Power; Service Learning; Student Attitudes; Student Organizations; Student Participation; Student Recruitment; Supervised Occupational Experience (Agriculture); Teacher Attitudes; Teacher Education; Team Teaching; Thinking Skills; Urban Education; *Vocational Education; World Wide Web
IDENTIFIERS Educational Marketing; Future Farmers of America; Georgia; Illinois; Indiana; Louisiana; Michigan; Missouri; Ohio; 4 H Clubs

ABSTRACT

The following are among the 47 papers included: "Academic Performance and Retention of College of Agriculture Students" (Garton, Dyer, King); "Perceptions of Recent Graduates and Employers about Undergraduate Programs in the College of Agriculture and Natural Resources at Michigan State University" (Heyboer, Suvedi); "Survey of Early Leavers" (Fanno, Cole); "Selecting a Major in Agriculture" (Wildman, Torres); "An Assessment of Agricultural Literacy in K-8 Schools" (Igo, Leising, Frick); "Comparison of Elementary Teachers' Use of Agriculture in Their Teaching" (Wilhelm, Terry, Weeks); "Developing a Process for an Elementary and Middle School Agriculturally Based Curriculum" (Hikawa, Trexler); "Measuring the Ethical Cognition Effect of a Videotape Livestock Show Ethics Education Program" (Goodwin, Briers, Murphy); "Status of Community Service Learning in 4-H Programs" (Wyble, Kotrlik); "Teams in Agricultural Education" (Cummins, Townsend); "Using Multivariate Analysis Techniques to Identify Factors Influencing FFA (Future Farmers of America) Membership in High School Agricultural Education Programs" (Gliem, Gliem); "Economic Impact of Supervised Agricultural Experience Programs in Georgia" (West, Iverson); "Supervised Agricultural Experience" (Camp, Fallon, Clarke); "Changes in Missouri SAE (Supervised Agricultural Experience) Programs" (Graham, Birkenholz); "Integrating Science in Agricultural Education" (Balschweid,

Reproductions supplied by EDRS are the best that can be made
from the original document.

Thompson); "Developing a Web-Based System to Address Accountability and Reporting Needs for Cooperative Extension" (Radhakrishna, Pinion); "Confirming Perception" (Lippert, Radhakrishna, Plank); "Perceptions of the Louisiana Legislature toward the Louisiana Cooperative Extension Service" (Hodson, Kotrlik); "Assessing Farmers' Internships and Needs for Specialty Corn and Soybean Information in the Lower Illinois River Basin" (Swanson, Samy, Sofranko, Harper, Frerichs); "Perceptions of Stakeholders toward Linkages and Curriculum in Urban Agricultural Education Programs" (Trede, Russell); "Developing an Urban Agricultural Education Program" (Russell, Trede); Using the AgEd Network as an Instructional Tool to Integrate Technology in the Classroom" (Thompson; Nelson); "Higher-Order Thinking Skills versus Lower-Order Thinking Skills" (Edwards, Briers); "Career Choices and Factors Influencing Career Change among Agricultural Education Graduates" (Garton, Cartmell); and "Cognitive Abilities of Preservice Teachers" (Torres). Also included are critiques of each paper and 11 poster abstracts. (MN)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 435 848

NAERC '99

Research

Fresh from Florida

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Proceedings of the 26th National Agricultural Education Research Conference

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
1

"Celebrating 26 Years of Progress in Agricultural Education Research"

December 11, 1999   Orlando, Florida

BEST COPY AVAILABLE

Proceedings of the 26th

National Agricultural Education Research Conference

1999

"Research Fresh from Florida"

Volume XXVI

December 11,1999

Orlando, Florida

The 1999 NAERC is a function of the Research Committee of the American Association for Agricultural Education with support from the Agricultural Education Division of the Association for Career and Technical Education. Faculty in the Department of Agricultural Education and Communication at the University of Florida were responsible for planning and conducting the research conference. The faculty would also like to acknowledge the efforts of John Ryder and Alison Edgell, departmental staff members who were responsible for coordinating publication of the proceedings.

ERIC

Previous Meetings and Chairs

Without the dedication of these chairs, NAERC would not be the success it is today

NAERC Chair(s)	Institution	Year	Location of NAERC
Hollie Thomas	Florida State University	1974	New Orleans, LA
Hollie Thomas	Florida State University	1975	Anaheim, CA
Glen Shinn	Mississippi State University	1976	Houston, TX
William Richardson	Purdue University	1977	Atlantic City, NJ
Bennie Byler	Mississippi State University	1978	Dallas, TX
Ronald Brown	Mississippi State University	1979	Anaheim, CA
L. H. Newcomb	The Ohio State University	1980	New Orleans, LA
Maynard Iverson	North Carolina State University	1981	Atlanta, GA
Dale Oliver	Virginia Tech	1982	St. Louis, MO
Paul R. Vaughn	New Mexico State University	1983	Anaheim, CA
Jimmy Cheek	University of Florida	1984	New Orleans, LA
Bob Stewart	University of Missouri	1985	Atlanta, GA
Alan A. Kahler	Iowa State University	1986	Dallas, TX
Alfred J. Mannebach	University of Connecticut	1987	Las Vegas, NV
Edgar P. Yoder	Pennsylvania State University	1988	St. Louis, MO
Michael F. Burnett	Louisiana State University	1989	Orlando, FL
Robert A. Martin	Iowa State University	1990	Cincinnati, OH
Larry R. Arrington	University of Florida	1991	Los Angeles, CA
John P. Mundt	University of Idaho	1992	St. Louis, MO
Dennis Scanlon	The Pennsylvania State University	1993	Nashville, TN
Thomas H. Bruening	The Pennsylvania State University		
David E. Lawver	Texas Tech University	1994	Dallas, TX
Robert Terry, Jr.	Texas A&M University		
Leon G. Schumacher	University of Missouri	1995	Denver, CO
Robert J. Birkenholz	University of Missouri		
George W. Wardlow	University of Arkansas	1996	Cincinnati, OH
Donald M. Johnson	University of Arkansas		
James J. Connors	University of Idaho	1997	Las Vegas, NV
Tim H. Murphy	University of Idaho		
Gary Moore	North Carolina State University	1998	New Orleans, LA
James Flowers	North Carolina State University		

The Peer Review Process

The National Agricultural Education Research Conference (NAERC) is the premier professional event in which research in agricultural and extension education is disseminated to the profession. Agricultural education professionals from throughout the United States and around the world submit their most recent research for presentation at the annual research meeting.

Each paper that is received is sent to three agricultural educators as part of the blind review process. Only those papers that receive favorable reviews are accepted for presentation at NAERC and for publication in the proceedings of the meeting. During June of 1999 there were 93 papers submitted for consideration. A distinguished group of 52 researchers served as reviewers for the papers.

Based on the reviewers' recommendations, the top 47 papers were accepted for presentation at the 1999 NAERC. The review process resulted in an acceptance rate of 51%.

ERIC

1999 NAERC Paper Reviewers

The chairs would like to recognize the work of this year's distinguished panel of reviewers.

Andrew Baker	Western Illinois University
Matt Baker	University of Florida
Mark Balschweid	Purdue University
Kirby Barrick	University of Illinois
Lloyd Blanton	Clemson University (Retired)
Gary Briers	Texas A&M University
Stanley Burke	Virginia Tech
Carol Conroy	Cornell University
Jacqueline Deeds	Mississippi State University
James Dyer	University of Missouri
Jerry Gibson	North Carolina State University
Laura Griffeth	Mississippi State University
Clark Hanson	South Dakota State University
Steve Harbstreit	Kansas State University
Joe Harper	University of Illinois
Don Herring	University of Arkansas
John Hillison	Virginia Tech
Tracy Hoover	University of Florida
Tracy Irani	University of Florida
Maynard Iverson	University of Georgia
Steve Jacob	University of Florida
Richard Joerger	University of Minnesota
Don Johnson	University of Arkansas
Barbara Kirby	North Carolina State University
Marvin Kleene	Washington State University
Jim Leising	Oklahoma State University
Vernon Luft	University of Nevada - Reno
Alfred Mannebach	University of Connecticut
Robert Martin	Iowa State University
N. L. McCaslin	The Ohio State University
Bruce Miller	Utah State University
Greg Miller	Iowa State University
John Mundt	University of Idaho – Boise Center
Ed Osborne	University of Florida
Don Peasley	Madison Oneida BOCES
Nick Place	University of Florida
Rama Radhakrishna	Clemson University
C. Van Shelhamer	Montana State University
Ching-Chun Shih	Iowa State University
Glen Shinn	Texas A&M University
Bob Stewart	University of Missouri
Michael Swan	Washington State University
Kirk Swortzel	Auburn University
Ricky Telg	University of Florida
Joan Thomson	The Pennsylvania State University
Bill Thuemmel	University of Massachusetts
Chris Townsend	Texas A&M University
George Wardlow	University of Arkansas
Jill Webster	Utah State University
Bill Weeks	Oklahoma State University
Linda Whent	University of California - Davis

ERIC Full Text Provided by ERIC

Table of Contents
National Agricultural Education Research Conference

NAERC '99
Research Fresh from Florida

December 11, 1999

6

ERIC Full Text Provided by ERIC

8

13

ERIC

Concurrent Session L:........................Teaching and Learning in Higher Education

Chair:	Richard Carter, Iowa State University
Discussant:	Carol Conroy, Cornell University
Facilitator:	Steve Harbstreit, Kansas State University

AAAE Poster Abstracts

NAERC '99
Research
Fresh
from
Florida

Academic Performance and Retention of College of Agriculture Students

Bryan L. Garton
University of Missouri

James E. Dyer
University of Missouri

Brad O. King
University of Missouri

INTRODUCTION/THEORETICAL FRAMEWORK

Universities across the nation have established criteria in the selection of students for admission. While the selection criteria vary among universities, most universities use some combination of high school grade point average, high school class rank, and ACT scores. However, are these admission criteria valid in predicting academic performance and retention of agriculture students?

Students' academic performance and their continued enrollment are a concern for universities and their respective colleges. Several studies have placed high monetary values on student retention (Dyer, Lacey, & Osborne, 1996; Glennen, Farren, & Vowell, 1996). Vernon (1996) noted that factors other than academic performance influence student retention. Dyer and Breja (1999) reported that retention could be predicted by examining the criteria by which students were admitted. They further indicated that traditional admission criteria were not the best predictors of academic performance and retention of agriculture students. Enrollment in secondary agriculture classes and agricultural experience were two factors that appeared to have a more accurate prediction value of student retention.

10

In addition to research concerning admissions variables, considerable research has been conducted regarding the relationship between students' learning styles and academic performance (Witkin, 1973; Gregorc, 1979; Garger & Guild, 1984; Claxton & Murrell, 1987; Schroeder, 1993). These studies concluded that when learning styles were considered in the teaching-learning process, student achievement was enhanced. Schroeder acknowledged that accommodating variations in learning styles could improve curricula, the teaching-learning process, and ultimately the retention of students in higher education.

Gregorc (1979) described a person's learning style as consisting of distinct behaviors which serve as indicators of how a person learns and adapts to his/her learning environment. The most extensively researched and applied learning style construct has been the field-dependence/independence dimension (Guild & Garger, 1985). Chickering (1976) noted that the field-dependence/independence dimension had major implications for college admissions and for faculty who make decisions about learning environments and practices. Dyer (1995) noted that in the field-dependence/independence learning style dimension, a person can also be categorized with a field-neutral (possessing characteristics of both field-dependent and field-independent) learning style.

Individuals who prefer a field-dependent learning style tend to perceive globally, have a more difficult time solving problems, are more attuned to their social environment, learn better when concepts are humanized, and tend to favor a "spectator approach" to learning. Additionally, individuals preferring a field-dependent learning style have been found to be more extrinsically motivated when organization and structure is provided by the teacher (Witkin et al., 1977).

Conversely, individuals who prefer a field-independent learning style tend to view concepts more analytically, therefore finding it easier to solve problems. Individuals preferring a field-independent learning style are more likely to favor learning activities that require individual effort and study. In addition, they prefer to develop their own structure and organization for learning, are intrinsically motivated, and are less receptive to social reinforcement. (Witkin et al., 1977).

Recent studies have focused on assessing the learning styles of students in colleges of agriculture. Learning styles have been found to have a positive relationship with academic performance, as measured by grade point average (Torres, 1993; Torres & Cano, 1994), performance in agriculture courses (Garton, Dauve, & Thompson, 1999), and overall success in higher education (Cano & Porter, 1997; Cano, 1999).

Previous research has identified students' learning styles and reported associations between learning style and academic performance. However, data is lacking that describes the relationship between university admission criteria and learning styles to students' academic performance and retention in colleges of agriculture. Consequently, what are the best predictors of students' academic performance and retention? Possessing this knowledge could provide faculty and academic advisors with the necessary information to assist at-risk students.

ERIC

PURPOSE/OBJECTIVES

The purpose of this study was to determine predictors of academic performance and retention of college agriculture students. The specific objectives of the study were to:

1. Describe the relationship between student learning styles and academic performance as measured by cumulative grade point average at the completion of their first semester and freshmen academic year.
2. Determine the best predictors of academic performance as measured by cumulative grade point average at the conclusion of the freshmen academic year.
3. Determine whether a linear combination of university admissions variables and/or learning style could predict the retention of students for enrollment for the sophomore year.

METHODS/PROCEDURES

Population and Sample

The target population for this ex post facto correlational study was freshmen entering the College of Agriculture, Food and Natural Resources at the University of Missouri during the 1997 Fall Semester ($\underline{N}$ = 326). The accessible sample consisted of an intact group of freshmen students enrolled in a college learning and development course ($\underline{n}$ = 245).

Instrumentation

The Group Embedded Figures Test (GEFT) developed by Witkin, Oltman, Raskin, and Karp (1971) was administered to assess the preferred learning style of each student as field-dependent, field-neutral, or field-independent. The total possible range of scores on the GEFT is 0 to 18. Individuals scoring 14 or greater were considered to prefer a field-independent learning style, individuals scoring 10 or less were considered to prefer a field-dependent learning style, and those individuals scoring from 11 through 13 were considered to prefer a field-neutral learning style.

The GEFT is a standardized instrument that has been used in educational research for over 25 years (Guild & Garger, 1985). The validity and reliability of the GEFT was established by the developers of the instrument (Witkin et al., 1971). The validity of the instrument was established by determining its relationship with the parent test, the Embedded Figures Test (EFT), as well as the Rod and Frame Test (RFT), and the Body Adjustment Test (BAT). The GEFT is a timed test, therefore internal consistency as a measure of reliability was measured by treating each section as split halves (r = .82).

Data Collection and Analysis

The GEFT was administered to all freshmen students in a college learning and development course during the second week of the fall semester. Academic performance was measured by cumulative grade point average at the completion of the first semester and freshmen academic year. University admissions variables included ACT score, high school class rank, and high school core grade point average. High school core grade point average was calculated based on courses required by the university for admission, and was determined from university admissions data. Retention was determined based on enrollment status at the beginning of the first semester of the sophomore year.

Descriptive statistics were generated on GEFT scores and academic admissions variables (ACT, high school core GPA, and high school rank). Pearson product-moment correlation coefficients were calculated between GEFT scores and academic admissions variables and were interpreted using Davis's (1971) descriptors. Regression analysis was used to explain variance in students' cumulative GPA at the completion of the freshmen academic year. Step-wise discriminant analysis was performed to build a predictive model of independent variables that could determine whether a linear combination of GEFT score, ACT score, high school class rank, and high school core GPA could be used to predict student enrollment status for the fall semester of the sophomore year. An alpha level of .05 was established *a priori.*

RESULTS/FINDINGS

The first objective sought to describe the relationship between students' learning styles and academic performance at the completion of their first semester and freshmen academic year. A majority (55.9%) of the students had a preference for a field-independent learning style. The remaining students were split between the field-neutral (24.5%) and field-dependent (19.6%) learning style preferences. Students were grouped according to cumulative grade point average at the completion of the first semester and freshmen academic year and categorized by their learning style preference.

As shown in Table 1, 79% of the students with a preference toward a field-independent learning style received a GPA of 2.5 or greater during their first semester of enrollment. Seventy seven percent of the students with a field-neutral and 63% with a field-dependent learning style achieved a GPA of 2.5 or greater during their first semester. Overall there was a low positive relationship ($\underline{r}$ = .16) between students' GEFT scores and their first semester GPA.

Table 1
Relationship Between Learning Style and Academic Performance at the Completion of the First Semester

Cumulative GPA	Field-Dependent n	Field-Dependent %	Field-Neutral n	Field-Neutral %	Field-Independent n	Field-Independent %
3.50 - 4.00	3	1.2	12	4.9	36	14.6
3.00 - 3.49	13	5.3	17	6.9	41	16.7
2.50 – 2.99	14	5.7	17	6.9	31	12.6
Total (≥2.50)	30 (62.5%)		46 (76.7%)		108 (78.8%)	
2.00 - 2.49	8	3.3	12	4.9	12	4.9
1.50 - 1.99	6	2.4	0	.0	7	2.8
below 1.49	4	1.6	2	0.8	10	4.0
Total (<2.50)	18 (37.5%)		14 (23.3%)		29 (21.2%)	

Note. $r = .16$; Cumulative GPA $M = 2.87$, $SD = .797$; GEFT $M = 13.3$, $SD = 3.88$

Similar relationships were found between learning style preference categories and cumulative GPA at the completion of the freshmen academic year (Table 2). Again, a low positive relationship ($r = .21$) was found between students' GEFT scores and freshmen academic year GPA.

Table 2
Relationship Between Learning Style and Academic Performance at the Completion of the Freshmen Academic Year

Cumulative GPA	Field-Dependent n	Field-Dependent %	Field-Neutral n	Field-Neutral %	Field-Independent n	Field-Independent %
3.50 - 4.00	4	1.6	10	4.1	34	13.9
3.00 - 3.49	10	4.1	16	6.5	39	15.9
2.50 - 2.99	15	6.1	18	7.3	33	13.5
Total (≥2.50)	29 (60.0%)		44 (73.3%)		106 (77.4%)	
2.00 - 2.49	11	4.5	15	6.1	16	6.5
1.50 - 1.99	5	2.0	0	.0	7	2.9
below 1.49	3	1.2	1	0.4	8	3.2
Total (<2.50)	19 (40.0%)		16 (26.7%)		31 (22.6%)	
Grand Total	48	19.6	60	24.5	137	55.9

Note. $r = .21$; Cumulative GPA $M = 2.88$, $SD = .699$; GEFT $M = 13.3$, $SD = 3.88$

BEST COPY AVAILABLE

The second research objective sought to determine the best predictors of students' academic performance at the completion of the freshmen academic year. As shown in Table 3, substantial positive intercorrelations were found between the predictor variables of ACT and high school core GPA (r = .56) and high school class rank (r = .54). In addition, a very strong positive association was found between high school core GPA and high school class rank (r = .86). Meanwhile, low positive associations were identified between GEFT scores and the predictor variables of high school GPA (r = .22) and high school class rank (r = .24). A moderate positive association was found between GEFT and ACT scores (r = .36). Substantial positive correlations were identified between the criterion variable (cumulative GPA) and high school GPA (r = .61) and high school class rank (r = .52).

Table 3
Intercorrelations of Variables Regressed on Cumulative Grade Point Average at the Conclusion of the Freshmen Academic Year

	Intercorrelations				
Variable	X_1	X_2	X_3	X_4	Y
GEFT (X_1)	1.00	.36	.22	.24	.21
ACT (X_2)		1.00	.56	.54	.47
High school core GPA (X_3)			1.00	.86	.61
High school class rank (X_4)				1.00	.52
Cumulative GPA (Y)					1.00

Note. ACT M = 24.8, SD = 4.0; High school core GPA = M = 3.38, SD = .52; High school class rank (percentile) M = 77.6, SD = 18.4

The intercorrelation matrix of predictor variables revealed the presence of multicollinearity, a potential violation of the assumptions in using multiple linear regression. Using guidelines offered by Lewis-Beck (1980), each independent variable was regressed on the remaining independent variables. R^2 values of .75 and .74 were found when independent variables were regressed on high school GPA and high school class rank (respectively), indicating a high degree of multicollinearity. Therefore, high school class rank was excluded from consideration in the regression equation.

Step-wise multiple regression was used to explain the variance in student cumulative GPA at the completion of the freshmen academic year. As shown in Table 4, 39% of the variance in cumulative GPA at the conclusion of the freshmen academic year could be explained by a linear combination of high school core GPA and ACT score. Students' GEFT scores did not enter the regression equation.

ERIC Full Text Provided by ERIC

Table 4
Step-wise Regression of High School Core GPA and GEFT Score on Cumulative GPA at the Conclusion of the First Academic Year

Variable	$\underline{R}^2$	$\underline{b}$	$\underline{t}$
High school core GPA	.37	.69	8.11*
ACT	.39	.03	3.12*
(Constant)		-.24	

*p < .05.

The third objective sought to determine the best predictors of retention as evidenced by continuing enrollment at the beginning of students' sophomore year. Universities use certain criteria to determine if students have been, or are likely to be, successful in their academic endeavors. By analyzing the admission criteria of the group of students who have been successful against the group of those who have not, the possibility exists to classify subsequent applicants for retention purposes based upon an analysis of admission criteria. To accomplish this, a discriminant analysis procedure was used to generate a predictive model of linear relationships between admission criteria (GEFT score, ACT score, high school core GPA) and continued enrollment. Descriptive data for the discriminating variables used for the model are presented in Table 5. Again, due to the presence of multicollinearity between the variables "high school core GPA" and "high school class rank," the latter variable was omitted from consideration.

Table 5
Means and Standard Deviations of Discriminating Variables

	Group			
Discriminating Variable	Not-continuing ($\underline{n}$ = 24)		Continuing ($\underline{n}$ = 221)	
	M	SD	M	SD
GEFT	14.27	3.53	13.14	3.88
ACT	23.91	2.89	24.83	4.14
High School Core GPA	3.14	.38	3.41	.50

Because of missing data on discriminating variables, the step-wise discriminant analysis procedure used mean scores for eight of the cases. The analysis produced a model with two discriminating variables; GEFT score and high school core GPA (Table 6). ACT score was eliminated as a discriminating variable. The centroid for students continuing their enrollment was significantly different from those students who did not return for their sophomore year (Wilks' Lambda = .95, $\underline{p}$ = .002). The discriminating power of the discriminant function, expressed as an eigenvalue, was .26. The degree of association between the groups and the discriminant scores was expressed as a canonical correlation of .45.

Table 6
Summary Data for Discriminant Analysis

Discriminating Variable	b	s	Group	Centroids
GEFT	-.71	-.51	Not-continuing	-.73
High School Core GPA	.88	.72	Continuing	.07
Eigenvalue	R_c		Wilks' Lambda	p
.26	.45		.95	<.002

The discriminant analysis model successfully predicted group membership in 66.7% of the cases for non-continuing students and 67% of the cases for continuing students (Table 7). Overall, the discriminant function correctly predicted 66.9% of the cases.

Table 7
Classification of Cases

Group	No. of Cases	Predicted Group	
		Not-continuing	Continuing
Not-continuing	24	16 (66.7%)	8 (33.3%)
Continuing	221	73 (33.0%)	148 (67.0%)
Percent of cases correctly classified: 66.9%			

CONCLUSIONS/IMPLICATIONS/RECOMMENDATIONS

Learners preferring a field-independent and field-neutral learning style exhibited higher academic performance, when using GPA, than their field-dependent peers during both the first semester and first year of college. However, a higher percentage of field-independent learners did not continue in college past their first year of enrollment. Further research is needed to explain this phenomenon. The question remains: Why did field-independent learners have greater academic success yet have a tendency to discontinue their enrollment in college?

The best predictors of academic performance during the first year of college was high school core GPA and ACT score. Although Witkin, Moore, Goodenough, and Cox (1977) noted that field-independent learners tend to favor careers in areas such as agriculture, GEFT score was not one of the best predictors of students' academic performance during their first year of enrollment in a college of agriculture. This is not an entirely surprising finding, although it is contradictory to Witkin et al.'s research.

Students with lower GEFT scores often out-perform strongly field-independent learners in courses commonly referred to as "general education", which largely comprise the course-load in which freshmen and sophomore students frequently enroll. During the first two years of college, students in colleges of agriculture are typically exposed to more non-agricultural curricula than agricultural course work. As a result, in-major study is often limited to the last two years of a student's academic career. Perhaps a more uniform mix of course offerings – or the postponement of selected general education courses to later years – would facilitate increased retention of field-independent learners.

Criteria used for college admission of students is a good predictor of academic performance, but has limited power and value as a predictor of student retention. Other variables appear to influence a student's choice to continue his/her education. Further quantitative and qualitative research is needed to identify those other variables that influence a student's decision to continue or discontinue their education.

ERIC Full Text Provided by ERIC

REFERENCES

Cano, J. (1999). The relationship between learning style, academic major, and academic performance of college students. Journal of Agricultural Education, 40(1), 30-37.

Cano J., & Porter, T. (1997). The relationship between learning styles, academic major, and academic performance of agriculture students. Proceedings of the 24th Annual National Agricultural Education Research Meeting, p. 373-380. Las Vegas, NV.

Chickering, A. W. (1976). Undergraduate academic experience. Journal of Educational Psychology, 63(2), 134-143.

Claxton, C. S., & Murrell, P. H. (1987). Learning styles: Implications for improving education practices. ASHE-ERIC Higher Education Report No. 4. Washington, DC: Association for the Study of Higher Education.

Davis, J. A. (1971). Elementary survey analysis. Englewood Cliffs, NJ: Prentice-Hall.

Dyer, J. E. (1995). Effects of teaching approach on achievement, retention, and problem solving ability of Illinois agricultural education students with varying learning styles. Unpublished doctoral dissertation, University of Illinois, Urbana-Champaign.

Dyer, J. E. & Breja, L., M. (1999). Predictors of Student Retention in Colleges of Agriculture. Proceedings of the 53rd Annual Central Region Research Conference in Agricultural Education, p. 93-100. St. Louis, MO.

Dyer, J. E., Lacey, R., & Osborne, E. W. (1996). Attitudes of University of Illinois College of Agriculture freshmen toward agriculture. Journal of Agricultural Education, 37(3), 43-51.

Garger S., & Guild, P. (1984, February). Learning styles: The crucial differences. Curriculum Review, 9-12

Garton, B., Duave, J. & Thompson, R. (1999, February). Predictors of Student Achievement in an Introductory Agricultural Economics Course. Proceedings of the 53rd Annual Central Region Research Conference in Agricultural Education, p. 102-108. St. Louis, MO.

Glennen, R. E., Farren, P. J., & Vowell, F. N. (1996). How advising and retention of students improves fiscal stability. NACADA Journal, 16(1), 38-41.

Gregorc, A. F. (1979). Learning/teaching styles: Potent forces behind them. Educational Leadership, 36, 234-237.

Guild, P. B., & Garger, S. (1985). Marching to different drummers. Alexandria, VA: Association for Supervision and Curriculum Development.

Lewis-Beck, M. S. (1980). Applied regression: An introduction. Series: Quantitative applications in the social sciences. Newbury Park, CA: SAGE Publications.

Schroeder, C. C. (1993, September/October). New students - new learning styles. Change. 21-26.

Torres, R. M. (1993). The cognitive ability and learning style of students enrolled in the College of Agriculture at The Ohio State University. Unpublished doctoral dissertation, The Ohio State University, Columbus.

Torres, R. M., & Cano, J. (1994). Learning styles of students in a college of agriculture. Journal of Agricultural Education, 35(4):61-66.

Vernon, J. R. (1996). The role of judgment in admissions. Unpublished doctoral dissertation, RAND Graduate School of Policy Studies, Santa Monica, CA.

Witkin, H. A. (1973). The role of cognitive style in academic performance and in teacher-student relations. Paper presented at a symposium sponsored by the GRE Board, Montreal, Canada. Princeton, NJ: Educational Testing Service.

Witkin, H. A., Moore, C. A., Goodenough, D. R. & Cox, P. W. (1977). Field-dependent and field-independent cognitive styles and their independent cognitive styles and their educational implications. Review of Educational Research, 47(1) 1-64.

Witkin, H. A., Oltman, P.K., Raskin, E., & Karp, S.A. (1971). Group Embedded Figures Test Manual. Palo Alto, CA: Consulting Psychologist Press.

ACADEMIC PERFORMANCE AND RETENTION OF COLLEGE OF AGRICULTURE STUDENTS

A Critique

David E. Lawver
Texas Tech University

The researchers are to be commended for expanding the body of knowledge as it relates to research about learning styles. Much has been done concerning the role of learning styles as related to the teaching-learning process. Likewise, a great deal of research has looked at prediction of success in college and retention. The authors of this manuscript have managed to explore a hereto fore neglected research area focusing on the relationship between university admissions criteria and learning styles to students' academic performance and retention in colleges of agriculture.

The introduction/theoretical framework for this study is very well written and is successful at building a case for this line of inquiry. The purpose of this study was to determine predictors of academic performance and retention of college of agriculture students. Specifically, the researchers sought to describe the relationship between student learning style and academic performance, to determine the best predictors of academic performance, and to determine whether a linear combination of university admissions variables and/or learning style could predict the retention of students. An intact group of 245 freshman agriculture students comprised the accessible sample for this study. The instrumentation, data collection, and analysis were conducted using correct and appropriate methodologies.

The researchers reported a low positive relationship between GEFT score and GPA. Field-independent and field-neutral learners exhibited higher academic performance. However, these same learners tended to discontinue enrollment at a higher rate than did their field-dependent counter parts. The researchers posed the question: Why did field-dependent learners have greater academic success yet have a tendency to drop-out? This reviewer would be interested in hearing theories or speculation concerning this.

A high degree of multicollinearity was found between high school rank and high school GPA. Therefore, the researchers chose to eliminate one of the variables from the multiple regression equation. The researchers eliminated high school rank. What was the logic behind eliminating high school rank and not GPA? GEFT scores did not enter the regression equation. Was this surprising to the researchers?

The researchers found that GEFT scores and high school GPA were discriminating variables when examining predictors of retention. It is interesting that GEFT scores did not enter the multiple regression equation used for objective #2 (academic performance) and yet was shown to be a discriminating variable in objective #3 (retention). Likewise, ACT scores entered the multiple regression table but was not found to be a predictor variable. What explanation do the researchers have for these differences?

It is concluded by the researchers that the criteria (ACT, GPA, rank, etc.) currently being used to predict academic performance are good predictors of academic success but not as good for predicting retention. What practical utility does learning style assessment have in identifying students who might be at risk of discontinuing?

This manuscript represents research that was very well done. Once again, the researchers are to be commended for a job well done that forces us to consider other variables in the quest to retain greater numbers of students.

NAERC '99
Research Fresh from Florida

Perceptions of Recent Graduates and Employers about Undergraduates Programs in the College of Agriculture and Natural Resources at Michigan State University: A Follow-Up Study

Gwyn Heyboer
Michigan State University

Murari Suvedi
Michigan State University

INTRODUCTION/THEORETICAL FRAMEWORK

Educators, administrators, employers and students have discussed the topic of improving agricultural undergraduate programs at major universities for many years. As the agricultural industry changes over time, the educational systems pertaining to agriculture and related subjects must not fall behind. Several reports have indicated the need for change in the curricula of agricultural programs (Kunkel, Maw and Skaggs, 1996; W.K. Kellogg Foundation, n.d.).

Michigan State University (MSU) formed the Council to Review Undergraduate Education (CRUE) in 1988 to look into quality issues of undergraduate education. It evaluated and recommended changes from an analysis of not only the undergraduate admissions and graduation

ERIC Full Text Provided by ERIC

requirements but also the character and content of the undergraduate education at MSU (CRUE, 1988). Following the CRUE report, department chairpersons in the College of Agriculture and Natural Resources (CANR) recommended that a college-wide task force be assembled to review undergraduate programs. The Task Force for Curricular Revitalization compiled many recommendations to improve the quality of undergraduate programs within the college. (Heinze, 1989)

The conceptual framework of this study was based on the challenge set forth by the W.K. Kellogg Foundation in its report "Visions of Change in Higher Education", which describes the efforts of 13 project teams across the United States to rethink the relationship between higher education and society. The report points out the need to find out whether undergraduate teaching programs of land-grant universities are still relevant to employers. Currently, universities are being challenged to improve undergraduate education, to achieve more balance between research and teaching, to globalize student learning, to create a more diverse student population, to re-examine fundamental values and to affirm that education is their primary mission (W.K. Kellogg Foundation, n.d.). These challenges should serve as an input for educational reform efforts. The workforce is continually reorganizing, and graduates should possess the knowledge and skills required by the industry of today.

Robson, Suvedi, Shivakoti, Pokarel, and Maughan (1986); Flores, (1996) and O'Malley, (1992) used follow-up studies of alumni to assess how well an academic institution has met its objectives. The present study was designed to provide feedback for curricular improvements in the CANR at MSU. It was based on the assumption that the experiences of past students during their undergraduate education, and the perceptions of their current employers regarding their educational preparation, could provide insights to improve the academic offerings of the CANR. The results of this study will ensure that the educational process is responsive to both the learners and the industry.

PURPOSE/OBJECTIVES

The purpose of this study was to assess the effectiveness of the CANR undergraduate programs as perceived by alumni and employers. Specifically, the objectives of this study were to:

1. Assess the perceptions of alumni toward the educational programs of the CANR, including courses taken and educational preparation.
2. Explore the opinions of the alumni about the quality of instruction received within the college.
3. Ascertain the opinions of alumni about their academic advising.
4. Determine whether the alumni found participation in extracurricular activities useful in relation to their current employment.
5. Seek the opinions of employers about the graduates' preparation by the college and their career performance.

METHODS/PROCEDURES

Population and Sample

The target population of the study comprised of CANR bachelor's degree graduates from summer semester 1993 through spring semester 1998. A list of 3,400 graduates from all departments within the college was developed. A stratified random sample of 1,269 graduates was used in the study. The strata were proportional to the size of the 12 academic departments within the CANR.

Instrumentation

The instrumentation for the study was a mail questionnaire. Two questionnaires were designed -- one for the alumni and one for their employers. The instruments included both open-ended and closed questions. The researchers developed the instruments after a careful review of previous follow-up studies; most scalar questions included in the instrument were adapted from these studies. The validity of the instrument was established through a panel of experts.

The instrument was tested for reliability using Cronbach's alpha procedures. For the alumni questionnaire, an alpha coefficient of .72 was determined for the scale pertaining to perceptions of educational preparation by required general courses outside the college; .76 for their education within the college; .79 for the preparation for work by the college; .89 for the quality of instruction; .89 for academic and career advising; .84 for extracurricular activities; and .75 for the graduates' satisfaction with their current positions. The employer questionnaire had an alpha of .87 for the scale relating to preparation for work by the college and .94 for the scale relating to career performance. These Cronbach alpha values were considered adequate to establish reliability for the scales included in this study.

Data Collection

The data collection procedure used in this survey followed the recommendations of Dillman (1994). The first mailing was sent to all members of the sample and included a personalized cover letter, the questionnaires and return envelopes. A follow-up postcard thanking the respondents and asking those who had not responded to send in the questionnaire was sent out a week after the first mailing. The third and final mailing was sent out with a new cover letter to those who had not responded three weeks after the initial mailing. The researchers noted a significant frame error in this study, as 156 of the packets (12 percent) were returned as undeliverable.

Altogether, 359 usable questionnaires were received from the alumni population, resulting in a response rate of 32 percent. The researchers recognize the need to have a higher response rate to be able to generalize findings to the population. However, early and late respondents were compared to determine if they differed significantly on selected variables under study, and no differences were observed. Therefore, as suggested by Miller and Smith (1983), we generalized the findings to the study population.

All alumni included in the sample also received a second survey packet designed for their employers. They were requested to give the employer survey packet -- including a cover letter,

questionnaire and pre-addressed stamped envelope -- to their respective supervisor. We received responses from 85 employers.

Analysis of Data

The data were analyzed using the Statistical Package for the Social Science (SPSS). Statistical methods such as means, frequencies, percentages, cross tabs, standard deviations and t-tests were used to analyze the closed-ended questions. The non-response error was dealt with through a t-test comparing responses from early and late respondents.

Limitations

A limitation of this study is that it includes only CANR graduates from 1993 to 1998 and their current employers. An employer population did not exist -- we requested the alumni to give the instrument to their respective employers. This study assumes that the alumni identified appropriate employers and that they represent the views of employing agencies. The lower response rate could be another limitation.

RESULTS/FINDINGS

Graduates within the CANR were asked to assess their education at MSU in terms of educational programs, quality of instruction, academic advising and extracurricular activities. Additionally, they were asked for information pertaining to their employment. Of the 359 alumni who responded in this study, 52.6 percent were female. Their ages ranged from 23 to 53 years, with the majority (93 percent) being younger than 30.

The majority (88.5 percent) indicated they were employed. Also, 42.5 percent indicated that they found their first position in less than a month after graduation as shown in Table 1. Male respondents reported taking less time to find their first employment related to their undergraduate degree than female respondents, and this time difference was statistically significant ($t=3.5$, $p<.05$). Interestingly, 33.3 percent of the respondents had two or more job offers at the time of their graduation.

Respondents were asked questions about their present employment. The majority (81.9 percent) of the respondents said they worked full-time. Also, over two-thirds (70.4 percent) indicated their positions were in the occupations they prepared for at MSU. A series of five questions were asked about their satisfaction with their current positions. A scale mean of 3.7 (St.Dev.=.79) was computed on a scale from 1 (poor) to 5 (excellent), indicating that graduates were satisfied with their current positions.

Table 1. Employment information.

How long it took to find first position	%
Less than one month	42.5
1 to 3 months	18.6
3 to 6 months	8.7
6 to 12 months	9.3
12 to 24 months	4.5
More than 24 months	2.8
Never	11.5
Not currently employed	2.0
Nature of employment	**%**
Full-time	81.9
Part-time	6.8
Self-employed	8.5
Unemployed	2.8
Number of full-time job offers at graduation	**%**
One	22.8
Two	13.4
Three	12.8
Four or more	7.1
None	43.9

When asked about the starting annual salary, the majority (47 percent) indicated a range of $10,000 to 24,999. The majority of respondents (29.4 percent) indicated their current annual salaries ranged between $25,000 and 34,999.

Perceptions of Educational Programs within the CANR

Graduates were asked to rate their educational preparation in terms of required courses, college courses and their preparation by the college for their career. Findings showed that preparation in the required general education courses of basic sciences, math, computers, economics, basic social sciences, and art and humanities were rated as "good". A scale mean of 3.1 (St.Dev.=.62) was found on a scale of 1 (poor) to 5 (excellent).

Graduates were also asked to indicate their agreement or disagreement with a series of statements about their education within the college at MSU. Respondents viewed their educational preparation within the college very positive in terms of their present positions. The specific questions asked are shown in Table 2. A scale mean of 4.0 (St.Dev.= .63) indicated that the majority of graduates "agreed" or "strongly agreed" with statements pertaining to their educational experience with the college. They "agreed" that the college prepared them to be problem solvers and to work easily with others, and that their education was current in relation to issues within their specific fields.

Table 2. – Opinions of alumni toward their preparation within college courses. (% of respondents)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean (SD)
Relates to my present job.	7.4	8.9	6.8	26.5	50.3	4.0 (1.3)
Was current in relation to issues within my field.	2.1	6.5	6.5	47.8	37.2	4.1 (.93)
Prepared me to be a problem solver when faced with new situations.	.30	5.7	11.1	51.3	31.6	4.1 (.82)
Prepared me to work easily with others.	.90	3.2	11.5	43.8	40.7	4.2 (.83)
Prepared me to be a leader.	1.4	8.3	22.1	38.1	30.1	3.9 (.98)
Taught me skills for my present job.	3.2	8.3	14.7	44.0	29.8	3.9 (.98)
Taught me the importance of being motivated.	1.7	7.8	21.8	38.8	29.9	3.9 (.98)

Scale mean = 4.0 (St.Dev.=.63)

Graduates and their employers were asked to rate the college on how well it prepared students in certain aspects of their careers. These items, consisting of various aspects of work, are shown in Table 3. Of these items, computer skills, math skills and knowledge of career opportunities were rated the lowest by alumni. The majority of alumni rated the remaining six categories as "good" or "very good". Over one-third of the graduates (36.5 percent) and 44 percent of employers indicated they were very well prepared to work in a team setting. Also, the employers rated ethical standards and getting along with people very high, while rating computer skills, math skills and writing skills the lowest.

A t-test was computed to find any significant differences between the alumni and employers' views concerning the preparation of students by the college. A significant t-value of 3.3, $p<.05$, was found between alumni and employers for their perceptions about the graduates' preparation for work. The employers perceived the preparation by the college more favorably than the alumni, as shown in Table 3 below.

Table 3. Comparison of alumni and employers' perceptions of graduates' preparation for work.

	Alumni		Employer	
	(N)	Mean (SD)	(N)	Mean (SD)
Writing skills	354	3.1 (.94)	82	3.4 (.85)
Oral communication skills	354	3.3 (.96)	84	3.6 (.97)
Math skills	347	2.8 (.96)	80	3.3 (.90)
Computer skills	352	2.5 (1.0)	83	3.4 (1.0)
Technical knowledge	350	3.1 (1.0)	84	3.6 (.93)
Getting along with people	349	3.5 (.95)	84	3.9 (.91)
Working in teams	353	3.7 (.94)	84	3.8 (.90)
Knowledge of career opportunities in your field	352	2.9 (1.2)	76	3.6 (.99)
Ethical standards	350	3.3 (1.0)	84	4.0 (.98)

Scale mean for alumni = 3.1 (St.Dev.=.61)

Scale mean for employers = 3.5 (St.Dev.=.65)

Quality of instruction

The alumni were asked to rate the quality of instruction they received in the college, on a scale of 1 (poor) to 5 (excellent), in terms of the teachers' knowledge, teaching skills, classroom discipline, helping the students outside of the classroom, evaluation of students' work and classroom assignments. Almost half (49.6 percent) rated their teachers' knowledge "very good" and one-fourth (25.1 percent) rated it "excellent". Most respondents rated the remaining categories as "good". Findings in Table 4 show a scale mean of 3.5 (St.Dev.=.70), which was computed for the alumni's overall opinions of their quality of instruction received in the college.

Table 4. The opinions of alumni toward the quality of instruction within the college. (% of respondents)

	Poor	Fair	Good	Very good	Excellent	Mean (SD)
Teachers' knowledge of subject areas.	0.6	4.5	20.3	49.6	25.1	3.9 (.83)
Teaching skills.	2.0	11.3	39.5	38.1	9.0	3.4 (.88)
Classroom discipline.	0.6	8.5	42.2	39.9	8.8	3.5 (.80)
Helping students outside the classroom.	3.4	12.1	32.2	29.7	22.6	3.6 (1.1)
Evaluation and grading of students' work.	0.8	9.9	41.7	39.2	8.5	3.4 (.82)
Classroom assignments.	1.4	8.7	44.5	37.5	7.9	3.4 (.81)

Scale mean = 3.5 (St.Dev.=.70)

Academic Advising

Questions about academic advising were asked using a Likert-type scale and included items such as helping the students find their first positions, choosing courses, preparing their resumes, assisting with interviewing skills and being easily accessible. A scale mean of 2.8 (St.Dev.=1.1) was computed for the participants' rating of their academic advising.

The majority of respondents "strongly agreed" that their academic advisors helped them in deciding which courses to take and that they were easily accessible to students. However, over 60 percent of the respondents "disagreed" or "strongly disagreed" that their advisor helped them in finding their first positions, preparing their resumes and assisting with interview skills.

Table 5. The opinions of alumni toward academic and career advising. (% of respondents)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean (SD)
Helped me find my first position.	35.7	28.9	6.5	15.0	13.9	3.9 (.83)
Helped me decide the courses to pursue.	9.2	15.2	33.9	6.0	35.6	3.4 (.88)
Helped me prepare my resume.	31.2	29.9	15.4	10.0	13.5	3.5 (.80)
Helped me with interviewing skills.	31.5	30.2	13.5	13.5	11.3	3.6 (1.1)
Was easily accessible.	6.0	10.8	39.0	5.7	38.5	3.4 (.82)

Scale mean = 2.8 (St.Dev.=.1.1)

Participation in Extracurricular Activities

Several questions were asked about respondents' opinions of internships, involvement in student organizations/clubs/teams and overseas study programs. Of the respondents, 68.5 percent had participated in internships. The majority (57.4 percent) found their internships themselves, 31.7 percent reported receiving assistance from their academic advisors' and 26.3 percent received assistance from other faculty members. Furthermore, alumni were asked a series of questions on a Likert-type scale about whether their internships were useful in finding their first employment, helped them decide on their first employment and helped them become more attractive to employers. Findings are shown in Table 6. A scale mean of 4.4 (St.Dev.= .77) was found, indicating the internship experience was useful in finding employment opportunities.

ERIC

Table 6. Usefulness of internship experiences. (% of respondents)

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean (SD)
Was useful in preparing you for your first position.	2.6	7.0	4.8	22.2	63.5	4.4 (1.0)
Helped you with deciding on your first position.	2.6	7.0	11.0	23.7	55.7	4.2 (1.1)
Helped you become more attractive to employers.	1.7	3.8	8.4	22.3	63.9	4.4 (.92)
Was a waste of your time.	75.6	16.9	4.5	2.1	.80	1.4 (.74)

Scale mean = 4.4 (St.Dev.=.77)

Findings indicated that a majority of the respondents (72.8 percent) were involved in on-campus student organizations, clubs or teams. Of those who were involved, 60.7 percent reported holding leadership positions. They were further asked on a scale from "strongly disagree" to "strongly agree" whether they felt their participation had a positive impact on their career preparation. A mean of 4.2 (St.Dev.=.96) indicated that most people "agreed" or "strongly agreed" that their participation had a positive impact on their career preparation.

It should be noted that those who were involved in campus student organizations, clubs or teams were more favorable toward their courses in the college ($t=3.7$, $p<.05$), preparation for their careers ($t=2.4$, $p<.05$), academic advising ($t=3.6$, $p<.05$) and satisfaction with current positions ($t=2.6$, $p<.05$) than those who were not involved in such activities.

Additionally, the respondents were asked whether they had participated in an overseas study program. About one out of six (16.4 percent) had participated in one of the study abroad programs at MSU. Almost all of them, (94.7 percent) indicated they would recommend similar experiences to other students.

Employers' Opinions of CANR Graduates

The employer survey asked questions about the preparation of students by the college and employers' opinions on the graduates' job performance. The questions on the students' preparation by the college were discussed previously in this paper. The questions concerning the graduates' job performance included items such as having adequate theoretical and practical knowledge; the ability to follow directions, work independently, ask relevant questions, supervise subordinates, report to supervisors and work with colleagues; and a rating of their overall job performance. A scale mean of 3.8 (St.Dev.=.76) was found on a scale from 1 (poor) to 5 (excellent), indicating that the employers rated the students highly in career performance.

ERIC

CONCLUSIONS/RECOMMENDATIONS

Findings indicated that the alumni were overall very favorable toward their college courses but rated their general education courses slightly lower. The general education courses could be enhanced by smaller classes, an increase in tutors and teaching assistants, and improved instructional methods. Further studies could also be conducted focusing on how alumni feel general education courses could be improved.

On preparation of students by the college, respondents indicated that they need more preparation in computer skills and knowledge of career opportunities. Computer skills could be increased by integrating a more technical computer emphasis in courses and by having more computer labs available. Computer skills are an essential requirement for the 21st century workforce. Knowledge of career opportunities could be increased through strengthening relationships between the faculty and industry by having faculty members attend workshops, conferences and career fairs.

Alumni were very satisfied with the overall quality of instruction in classes within the college. They rated the teachers' knowledge of subject areas the highest. However, they indicated a need to strengthen instructors' teaching skills, evaluation and grading skills, and classroom assignments. The teachers could go through a series of training sessions to improve their instruction skills.

Academic advisors were rated highly in helping students decide on their courses and being easily accessible. However, the alumni saw the need for improvement in helping them find their first positions, in preparing their resumes and in helping with interviewing skills. The college could offer academic advisors training on how to advise students. Similarly, the academic advisors may be encouraged to visit prospective employers and to get a better understanding of industry needs. Also, a one-credit class could be offered to seniors focusing on career searching, resumes and interviewing skills.

Extracurricular activities were a very positive aspect of the graduates' educational experience, and one they found useful in preparation for their employment. The college should provide more support and guidance to student organizations. Also, the study abroad program is an emerging trend in the undergraduate program that has helped expose students to cross-cultural experiences. The majority of the students who participated in the study abroad program recommended the experience to other students. Thus, colleges should encourage students to participate in study abroad programs and continue to create new programs.

The employers found math, computer and writing skills as areas needing improvement. These skills were also identified as areas needing improvement by graduates of the college. Curricular improvement efforts should take into account these expressed needs.

REFERENCES

Council to Review Undergraduate Education. 1988. Opportunities for Renewal: The Report of CRUE. East Lansing, Mich: Michigan State University.

Dillman, D.A., and P. Salant. 1994. How to Conduct Your Own Survey. New York: John Wiley & Sons.

Flores, M.Q. 1996. Using Graduates and Their Employers to Help Assess Agricultural Programs: The Centro Universitario De Oriente (Cunori) Case. Doctoral dissertation, Michigan State University, 1995.

Heinze, K.L. (Ed.). 1989. Shaping Agriculture and Natural Resources Undergraduate Education for the Future-A Land Grant Imperative. (Report of the Task Force for Curriculum Revitalization). Michigan: College of Agriculture, Michigan State University, 1989.

Kunkel, H.O., I.L. Maw, and C.L. Skaggs. 1996. Revolutionizing Higher Education In Agriculture. Iowa: Robson & Associates.

Miller, L.E., and K.L. Smith. 1983. Handling Non-response Issues. J. Ext., 21: 45-50.

Norusis, M.J. 1998. SPSS 8.0 Guide to Data Analysis. Illinois: Prentice-Hall, Inc.

O'Malley, M.M. 1992. Perceptions of Michigan State University Agricultural and Natural Resources Communication Alumni Toward Their Career Preparation: A Follow-up Study. Unpublished master's thesis, Michigan State University, East Lansing, Mich.

Robson, R.E., M.P. Suvedi, G.P. Shivakoti, B.N. Pokarel, and W.T. Maughan. 1986. Study of the IAAS Graduates. Utah State University/IAAS-II Project, Rampur, Chitwan, Nepal.

W.K. Kellogg Foundation. n.d. Visions of Change in Higher Education. Available on-line at: <http://wkkf.org/Publications/VisionBk/vis_htm>.

PERCEPTIONS OF RECENT GRADUATES AND EMPLOYERS ABOUT UNDERGRADUATE PROGRAMS IN THE COLLEGE OF AGRICULTURE AND NATURAL RESOURCES AT MICHIGAN STATE UNIVERSITY

A Critique

David E. Lawver
Texas Tech University

The researchers examined perceptions of graduates and their employers concerning undergraduate programs at Michigan State University. It is widely believed that Higher Education should and must be more responsive to the needs of graduates and the needs of the industries that employs graduates. The W.K. Kellogg Foundation has been funding several projects that are focused upon making higher education more accountable and responsive to citizens.

The authors did an excellent job of establishing a theoretical framework for the need for this study. The purpose of the study was to assess the effectiveness of College of Agriculture and Natural Resources undergraduate programs at Michigan State University as perceived by graduates and employers. The population (N = 3400) consisted of bachelor degree recipients from summer 1993 to spring 1998. A stratified (by academic department) random sample of 1,269 graduates were sent surveys. A response rate of 32 percent (359) was achieved, a low response rate at best. A weakness in the design is the method by which employers were surveyed. Graduates were to give the employer version of the questionnaire to their respective employers for completion. Only 85 (6.7%) employer questionnaires were returned. The authors state that this lower response rate "could" be a limiting factor. This reviewer believes that this is understated and that any findings that are dependent upon employer response must be viewed as being highly questionable. No attempts to control non-response error were found in the manuscript. It is unfortunate that the response rates were low in that it is very important that Universities know the perceptions of graduates and their employers. What recommendations do the researchers have for insuring better response rates from both populations? On a more positive note, reliability coefficients were established and determined to be adequate by the researchers. However, it is not reported whether reliability was determined a priori or post hoc.

The researchers at one point in the manuscript report a significant difference between employer and alumni views concerning the preparation of students by the college. A t-test was used to determine this difference. The unequal sample size is of concern in regard to this finding. The authors fail to report whether a dependent or independent t-test was used. Homogeneity of variance is assumed when conducting t-tests. The effect of violating this assumption depends primarily upon the sizes of the two samples. When sample size is equal the effect of the violation is not serious. However, with unequal samples, one should test for homogeneity of variance. No evidence of this test was found. It should also be noted that the researchers conducted multiple t-tests. Multiple t-tests can increase the experimentwise error rate.

The researchers found that alumni were very satisfied with the overall quality of instruction within the college. Satisfaction was high concerning instructor knowledge but it was indicated that there is a need to strengthen instructional skills and job-seeking skills. These findings are consistent with most follow-up studies. It was recommended in the manuscript that

ERIC Full Text Provided by ERIC

training be available to improve both of these areas. Do the researchers have suggestions as to the form of the training and also if there are possible incentives for faculty who improve in these areas?

ERIC

NAERC '99
Research Fresh from Florida

Survey of Early Leavers: Implications for Recruitment and Retention

Wayne Fanno
Oregon State University

R. Lee Cole
Oregon State University

INTRODUCTION

The recruitment and retention of students at the university is important to the success of most major higher education systems. This is true of Colleges of Agriculture which will see an increased demand for agricultural and allied graduates throughout the next decade and a continued shortage of trained graduates (USDA, 1995). Agriculture Education has seen an acute shortage of graduates and continues to project shortages in the profession. To provide an effective strategy for the recruitment of new students and to retain a higher percentage of current students a better understanding of the students who were leaving the College of Agricultural Sciences was needed.

THEORETICAL FRAMEWORK

In research that focused on entering freshmen and assessing educational attitudes and needs, Donnermeyer and Kreps (1994) report on factors that influenced freshmen decisions to enroll in Colleges of Agriculture. Based on a survey of 217 freshmen agricultural majors at The Ohio State University, the researchers concluded that "a myriad of diverse factors seem to influence the decision of those who chose to enroll in a College of Agriculture." These factors ranged from parental influence to experiential backgrounds in agriculture. Similar attitudinal research on new students was conducted by Scofield (1995), at Iowa State University (ISU). In this research it was found that parents had the greatest level of influence on a student's decision to attend ISU (20%), followed by ISU students (15.6%), Vo-Ag Instructor (15.5%), other family

ERIC

members (12.9%), and scholarships (12.0%). Dyer et al. (1996) found that 94.9% of the College of Agriculture freshmen that had enrolled in high school agriculture programs in Illinois indicated that they intended to graduate with an agricultural degree from the College of Agriculture at the University of Illinois. The researchers also found that only 52.9% of the freshmen in the College of Agriculture at the University of Illinois who had not enrolled in high school agriculture intended to graduate with an agricultural degree.

In other research related to recruitment, Fritz and Sandall (1995) focused on students majoring in Agricultural Education and concluded that student exposure to or participation in agricultural youth programs (FFA and 4-H), recruitment materials, and high school agriculture teachers all had a positive impact on student recruitment. Barrett et al. (1987) pursued the implications of personality traits for retention and recruitment for College of Agriculture students. They concluded that personality traits should be addressed in recruitment methods and materials, thus improving retention. They also concluded that teaching styles should be used that meets the needs of specific student personality trait types. Nokes and Gustafson (1994) provide 18 specific practices for a faculty to use in recruiting and retaining women in Agricultural Engineering programs ranging from using first names to getting women involved with research.

For the past several years the College of Agricultural Sciences (CAS) at Oregon State University (OSU) has maintained higher than average growth compared with other colleges in the university. However, retention remains a major concern for all colleges at the university. Although several studies have explored student retention or recruitment on multiple levels, reliable data on students who had left the college and the university without completing a degree program was not available. To be more effective in reducing the number of early leavers, data was needed regarding these students. This study's objective was to describe "what is," which in turn may help describe "why."

PURPOSE AND OBJECTIVES

The purpose of the study was to identify why students left the CAS before completing their Baccalaureate degrees. Specifically, the objectives of the study were to:

1. Identify if differences existed among students who left CAS and students who left both the CAS and the University.
2. Identify why students left CAS and the University.
3. Identify specific points of satisfaction and dissatisfaction for students who left before completing their degrees.

METHODS AND PROCEDURES

The students participating in this study were divided into two groups, those who left the College of Agricultural Sciences but did not leave Oregon State University (Part A) and those who left both the CAS and OSU (Part B). The population for the study was the 483 students who left the CAS, according to Registrar's records, over the five-year period between 1992-1997. The entire population was surveyed for both those who left the CAS but stayed at OSU in a different college, and for those who left both the CAS and OSU. Statistical analysis was done by frequency count and percentages to describe the population. The Continuity Adjusted Chi-Square was used at

the .05 alpha level to declare a gender significance. The mailed instrument was developed by the Survey Research Center at Oregon State University. Validity and reliability were determined by a field test of students who had left the university earlier than those of the survey group. Both quantitative and qualitative responses were sought by the researchers.

Baseline data for this study from CAS records showed that 1038 male undergraduates (50.7%) and 1011 female undergraduates (49.3%) were in the CAS at OSU. Participation in CAS club activities averaged 45% for all students in CAS and 35% of all CAS students received some form of scholarship support.

RESULTS

Part A

Part A results were for students who left the CAS but not OSU. The population for Part A consisted of 83 students, 40 of whom responded (48 percent response rate). The students surveyed had left the CAS two to eight quarters before the date of the survey but transferred to another OSU college. A Continuity Adjusted Chi-Square was only used to declare gender differences. Three follow-up mailings were done after the initial mailing for a total of four mailings.

- Most students (72.5%) were still working on their degrees.
- Eighty-five percent (85%) percent reported a change of a career goal as the reason for changing colleges and majors.
- The OSU college that received most (44.4%) of these was the College of Liberal Arts.
- Of the 40 respondents in Part A 32 (80%) were female and eight (8) were males (20%), therefore a significantly higher percentage of females left CAS but stayed at OSU as compared to males. The CAS has a near 50-50 female to male ratio. From qualitative input, females reported 12 times (38%) and males reported zero times that the scientific rigor of the CAS curriculum exceeded their expectations and that scientific content of the CAS courses therefore became a reason for leaving the CAS. These females reported that their high school science preparation was inadequate for the curriculum they faced in the CAS.
- Males who left CAS but stayed at OSU reported receiving significantly less scholarship support in the CAS than females who left the CAS but stayed at OSU. Two (2) males (25%) received scholarships and left CAS (therefore 75% of the males who left CAS had no scholarship support). Sixteen (16) females (50%) had scholarship support and left CAS. Average scholarship support for all students in the CAS was 35 percent. Therefore, males who left the CAS received less than average scholarship support, whereas, females who left the CAS received higher than average scholarship support.
- Only 22 percent of both males and females reported belonging to CAS clubs (as compared to 45 percent membership rate among CAS students) but 62.5 percent reported belonging to OSU clubs.
- Eight males (100%) and 30 females (94%) who left CAS reported no previous FFA involvement. About 30 percent of CAS students were involved in the FFA.
- Eight males (100%) and 19 females (59%) who left CAS reported no previous 4-H involvement. About 36 percent of CAS students were involved in 4-H.
- Twenty percent (20%) of the students who left CAS but stayed at OSU reported starting in CAS because of scholarship support.

Part B

Part B results are for students who left both the College of Agricultural Sciences (CAS) and Oregon State University (OSU). Four hundred 400 students left OSU and the CAS during the five years of 1992-1997. This survey was mailed to all 400 with a response received from 160 for a 40 percent response rate, after a total of four mailings.

- The highest ranking reasons for leaving the CAS and the university were:
  - 46.9 percent -- lack of money,
  - 44.4 percent -- a change of career goal,
  - 30.2 percent -- dissatisfaction with curricula or teachers, and
  - 26.3 percent -- poor progress toward graduation.
- When asked why they initially enrolled at OSU the responses were:
  - 63 percent -- to secure a desired job
  - 41 percent -- because the family wanted them to
  - 39 percent -- they knew an OSU student
  - 23 percent -- received an initial scholarship
  - 21 percent -- the social activities
- Seventy-six (76%) of the students who left both CAS and OSU were not involved with CAS clubs or activities. Eighty two percent (82%) of those who left had not been involved with FFA and 69 percent had not been involved with 4-H. Non-involvement in FFA and 4-H for the CAS averaged 70 percent and 64 percent respectively.
- Eighty-two percent (82%) of the students in Part B of this survey had not received a degree at the time the survey was completed and only 4.4 percent were still working on degrees from other institutions (primarily community colleges).
- Eighty-nine percent (89%) of the students who left both OSU and the CAS went to work initially after leaving OSU.

In comparing gender related issues for those leavers of both OSU and the CAS:

- More males (97%) than females (93%) went directly into the work place.
- More males (31%) went into military service after leaving OSU as compared to females (0.6%).
- There was no significant difference by gender for numbers of students who left both OSU and CAS. (70 males and 89 females, with one gender response missing.)
- Females (52%) reported a change of career goal more frequently than males (34%).
- Females who left (36%) were more likely to have been involved with university level clubs and student activities than males who left (21%) both OSU and the CAS.
- Females who left (32%) were more likely to be in the dorm system as compared to males who left (11%), whereas males who left (14%) were more likely to be in the Greek system than females who left (6%).

OSU data shows that early leaver housing arrangements are consistent with university averages for housing.

ERIC

PRACTICAL IMPORTANCE OF THE STUDY

The main differences between students who left the CAS but stayed at OSU as compared to those students who left both the CAS and OSU were 1) students who stayed at OSU but left the CAS reported a change in career goal as the main reason for leaving, whereas 2) the students who left both the CAS and OSU reported a lack of financial resources as the main reason for leaving.

Connectedness seems important to retaining students. Students who left in both Part A and Part B of this study reported lower involvement with CAS clubs and activities than the CAS average. The CAS should recruit a higher percentage of students with FFA and/or 4-H backgrounds. More of these students tend to stay in the CAS to the completion of their degrees than students who do not have this background. Targeted recruitment may help retention numbers. However, total numbers of students also remains a concern for university administrators. Retention and recruitment may have conflicting goals at times.

Recruitment efforts should give students accurate information about majors, especially the science required to be successful in the major. Too frequently recruitment efforts do not provide adequate information about the majors or the preparation necessary to be successful in the majors. Specifically the science background necessary for success.

High school counselors should be made aware of the science-based nature of CAS programs so they can direct students to both agricultural classes (and FFA participation) and science classes. If scholarships are to be granted and retained, students must have the scientific background necessary to be successful in agriculture.

Through the average number of scholarships gained by early leavers was not different from scholarships gained by those continuing their CAS degrees, both groups of leavers in this study report a serious lack of financial resources. With nearly 50 percent of the early leavers reporting lack of money as a major reason for leaving the university it seems reasonable that scholarship support needs to be increased for both recruitment and retention. Students who have average academic capability but who have the potential for becoming dependable, honest, trustworthy employees in jobs that require a Baccalaureate degree need scholarship support. Systems should be devised to get scholarship aid to students with GPA's in the 2.00-3.00 range. Further, scholarship committees should look beyond GPA for granting purposes. Indicators of career goals in agriculture and a desire to make a contribution to agriculture plus evidence of past work experience or youth activities in agriculture should be used to direct scholarship support to students most likely to stay in agricultural programs and enter agricultural careers.

Too many students reported low-value courses (from the standpoint of content) and poor quality instruction. Colleges of Agriculture and universities in general should take the challenge of providing a relevant and timely curricula, provided by high quality teachers who know both the research and the practice of what they teach. Then teach using methodology conducive to retaining students.

REFERENCES

Barrett, L.A., R. Sorensen, and T. Hartung. 1987. Personality Types of Agricultural College Students Implications for Teaching, Retention and Recruitment. NACTA Journal. 31(4):14-19.

Donnermeyer, J.F. and G.M. Kreps. 1994. Assessing College of Agriculture Freshmen. NACTA Journal. 38 (1): 45-48.

Dyer, J.E., R. Lacey, and E.W. Osborne. 1996. Attitudes of University of Illinois College of Agriculture Freshmen Toward Agriculture. Journal of Agricultural Education, 37(3):33-42.

Fritz, S. and D. Sandall. 1995. Effective Recruiting Strategies for Agricultural Education Majors. A paper presented to the Central Region 49th Annual Research Conference in Agricultural Education. St. Louis, Missouri:12-19.

Nokes, S.E. and R.J. Gustafson. 1994. Recruiting and Retaining Women in Agricultural and/or Biological Engineering. NACTA Journal. 38(1):49-53.

Scofield, G.G. 1995. College of Agriculture New Student Profile: A paper presented to the Central Region 49th Annual Research Conference in Agricultural Education. St. Louis, Missouri:1-10.

USDA. 1995. Employment Opportunities for College Graduates in Food and Agricultural Sciences: Agriculture, Natural Resources and Veterinary Medicine. School of Agriculture, Purdue Univ.

SURVEY OF EARLY LEAVERS: IMPLICATIONS FOR RECRUITMENT AND RETENTION

A Critique

David E. Lawver
Associate Professor

Retention of college of agriculture students is certainly deserving of research efforts within our profession. As the authors pointed out in their introduction, there is a projected increased demand for agricultural and allied graduates through the next decade. However, there is a shortage of qualified graduates prepared to enter the work force. This effort focused upon gaining an understanding as to why students might leave a particular major.

The purpose of this study was to identify why students left the College of Agricultural Sciences (CAS) before completion of a baccalaureate degree. Specifically, the authors sought to identify any differences that might exist among students who left CAS and students who left both the CAS and the University. They also investigated reasons for leaving CAS and the University and specific points of satisfaction/dissatisfaction held by early leavers.

Of 83 students who were identified as having left CAS but not the University, 40 responded. Of those who left the university (400), 160 responded to the questionnaire. The researchers attempted to increase response rate with a total of four mailings. Other than the four mailings, there is no evidence of other efforts to control non-response error. Over 50% of both groups failed to respond to this study. It would be nice to be able to report that there is no difference between respondents and non-respondents.

It is interesting to note that the Survey Research Center at Oregon State University developed the instrument. To what degree were the authors involved in the development of the instrument? Is the study reported here a portion of a much larger follow-up study conducted by the Survey Research Center?

It is reported in this study that most of the students who left the CAS but stayed at the University had a change in career goals. It would be interesting to know the circumstances behind a change in career goals. Is it an indication of an initial lack of information? Can the change be attributed to youthful fickleness? Are the students dissatisfied with some aspect of their initial major? It is important that students choose a career path that is well suited. Could it be that these changes in career aspirations are actually in the best interest of the student? Above all else, we should want what is best for the student. Students who left CAS and the University most frequently reported lack of finances as the reason for leaving followed closely by a change in career goals.

One of the stated objectives for this study was to identify specific points of satisfaction and dissatisfaction for students who left before degree completion. Few if any of the results address satisfaction/dissatisfaction. A full discussion of the findings related to this objective might prove to be useful in reducing the number of early leavers. Much of the time an objective might be overlooked due to lack of space. The manuscript this discussant reviewed was double-spaced

whereas the specifications for the paper were for single-spacing. The authors would have had ample space to address satisfaction/dissatisfaction to a greater degree.

A final thought concerns students who might choose to transfer into the CAS after initially enrolling in another college or institution. It would be interesting to know why students decide to change to an agriculture major at OSU. Does OSU experience a net gain or loss in enrollment? Overall, this research provides useful information for those involved in recruitment and retention in the College of Agricultural Sciences at Oregon State University. Readers of the manuscript should be able to learn valuable lessons concerning the conduct of similar research.

ERIC

NAERC '99 Research Fresh from Florida

Selecting a Major in Agriculture: Implications for Recruitment in Agricultural Education

Malissia Wildman
New Mexico State University

Robert Torres
New Mexico State University

INTRODUCTION

Colleges of agriculture across the United States have seen a decline in enrollment during the past decade (Donnermeyer & Kreps, 1994; Jackman & Smick-Attisano, 1992; Mallory & Sommer, 1986; National Research Council, 1988; Schuster & Costantino, 1986). Concern about the substantial decline in agriculture student numbers has been significant, and much research has been devoted to identifying and addressing the problem. Coinciding with the decline in enrollment is a change in the demographics of agricultural professions. Agricultural occupations such as production have been most affected because of the changes in the food and agriculture system. The food and agriculture system has developed into a wider array of occupations reflecting public expectations. The modern food and agricultural system encompasses not only primary production, processing, marketing, and retailing, but also natural resources and the environment; human communities and their well being; and consumer health, safety, and ethics (Kunkel, Maw, & Skaggs, 1996, National Research Council, 1996).

Further, the National Research Council (1996) stated that the modern U.S. food and agriculture system is large, complex, diverse, and dynamic, and colleges of agriculture should reflect these contemporary changes. How can colleges of agriculture encourage, recruit, and educate new agricultural scientists and professionals for today's dynamic world?

ERIC Full Text Provided by ERIC

THEORETICAL FRAMEWORK

The National Research Council (1996) suggested that the food and agricultural system needs a highly educated work force that includes scientists, engineers, and technicians. A national interest is to maintain high-quality undergraduate and graduate teaching programs to attract the best and brightest students. Colleges of agriculture are challenged to seek new and innovative ways to appeal to potential students. Recruitment begins with identifying the various student populations and discovering what has the greatest influence on their decision to select an agriculture major.

A review of literature identified several sources that are considered influential in selecting an agriculture major. The sources of influence have been grouped into five principal factors including 1) exposure to agriculture, 2) family and friends, 3) college of agriculture recruitment activities, 4) professionals, and 5) job considerations.

The sources of influence related to exposure to agriculture included prior experiences, relatives in agricultural work, radio broadcasts, TV programs, and literature (Schuster & Costantino, 1986). Donnermeyer and Kreps (1994) found that students already exposed to agriculture tended to enroll in agriculture majors more often than students without exposure. Similarly, family and friends of students have been considered an influential factor in choosing an agriculture major. Parents with an agriculture background, more often than not, have a significant impact on a student's choice in attending an agriculture college (Donnermeyer & Kreps, 1994; Schuster & Costantino, 1986). However, family members have a mixed effect on students' decisions. The family generally influences students to go to college, but does not necessarily help select a major (Jackman & Smick-Attisano, 1992). Family role models, however, were found to influence students' career decisions (Fisher & Griggs, 1995).

Persons in colleges of agriculture design and facilitate recruitment strategies to introduce the variety of available agriculture majors to students who have not been exposed before to such majors (Rawls, 1995). Other college-related sources of influence that affects students' decisions to select a major in agriculture are the reputation of the college and faculty, facilities, geographical location, cost of tuition, and financial incentive in the form of scholarships (Donnermeyer & Kreps, 1994).

High school professionals have a definite role and responsibility to expose students to the many career opportunities (Fisher & Griggs, 1995). School teachers and counselors provide guidance and structure to help students select a positive career goal(s). However, in several studies, students reported that high school teachers and counselors do not encourage students to choose agriculture majors (Jackman & Smick-Attisano, 1992; Mallory & Sommer, 1986; National Research Council, 1988).

Job considerations also impact students' choice of major. Such considerations include the nature of the work (i.e., working out doors, working with people and/or animals), availability and location of job, income after college, and prestige of career area (Rawls, Martin, Negatu, & Robertson, 1994).

ERIC Full Text Provided by ERIC

Based on the literature, an assortment of factors influence students' decisions to select a major in a college of agriculture. While no single factor may influence a student's choice of major, investigating the variables that most influence students can help in developing effective recruitment strategies for attracting students into agricultural education and the various majors in colleges of agriculture in order to meet the demands of the agricultural industry.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the degree of influence selected factors had on students' choice of an agriculture major. The following objectives were identified to accomplish the stated purpose:

1. To describe students majoring in an agricultural discipline by demographic characteristics (gender, age, ethnicity, community of origin, classification level).
2. To describe the sources that most influenced students' choice of agricultural major.
3. To describe the sources that least influenced students' choice of agricultural major.

METHODS

The accessible population for the descriptive study was full-time students declaring an agriculture major at a selected land-grant university during the 1997 spring semester. The frame for the study was intact groups (N=26) in all lower-division (100-299) agriculture courses offered by New Mexico State University, College of Agriculture in the 1997 spring schedule of classes. Lower-division courses were selected to increase the likelihood of obtaining students from all four classifications (freshmen, sophomores, juniors, and seniors). Of the courses offered, 50% (n=13) of the courses were randomly selected for the study. A total of 115 unduplicated students from the selected courses comprised the sample of the study.

Data were collected using a questionnaire developed by the researchers. The questionnaire was designed to gather data on the five principal factors influencing choice of major using a five-point Likert-type scale. Forty-six response items comprised the sources of influence and grouped by principal factor. The questionnaire was designed and constructed according to Dillman's Total Design Method (1978). Additionally, a section was developed to elicited demographic information from respondents.

The questionnaire was assessed for validity and reliability. A panel of five experts consisting of three faculty and two graduate students in agricultural education reviewed the questionnaire for face and content validity. Comments and input offered by the panel were incorporated into the questionnaire. To ascertain the reliability of the questionnaire, a pilot test was administered to 25 college of agriculture students not targeted in the study. Allowing for one week lapse in time, a test-retest approach for assessing reliability was employed during the 1997 spring semester. The criterion percent of agreement for the test-retest results was set a *priori* at a minimum level of 75% agreement. Permitting plus or minus one unit of change, the resultant percent agreements for the response items ranged from 75% to 100%. Because of the static nature of demographic data, reliability was not assessed in this section.

ERIC Full Text Provided by ERIC

The data were collected by administering the questionnaires to students in the randomly selected agriculture courses. Uniform procedures were exercised for collecting data to control for potential biasing. All students were allowed to complete the questionnaire, but, questionnaires from students not meeting the target population description were eliminated from the study. Prior approval by the course instructors was given before administering the questionnaire. All instructors of selected courses approved and participated in the data collection. A total of 115 (unduplicated) students participated in the study.

Response data were coded, entered into a personal computer, and analyzed using SPSS for Windows (Statistical Package for the Social Science 6.1). Descriptive statistics such as measures of central tendency and measures of variability were used to evaluate and describe the data.

RESULTS

Demographic data were gathered to profile the respondents (Table 1). Slightly more than half of the respondents were males (53.9%), with females comprising 45.2 percent of the sample. The mean age of the respondents was 22 years, ranging from 18 to 39. The predominate ethnic group was White (52.2%), followed by Hispanic (30.4%).

The remaining ethnic groups in the sample included respondents representing more than one ethnicity (9.6%), American Indian (5.2%), and Asian (0.9%).

The majority of the students (55%) grew up in towns or cities with populations greater than 5,000. Additionally, the majority of the respondents (54%) were upper division students (juniors or seniors) in college.

ERIC Full Text Provided by ERIC

Table 1
Student Demographic and Academic Characteristics (n=115)

Characteristic	f	%	M	SD
Gender				
Male	62	53.9		
Female	52	45.2		
Missing Data	1	0.9		
Age[a]			22.1	4.10
Ethnicity				
White (Non-Hispanic)	60	52.2		
Hispanic	35	30.4		
More than One Ethnicity	11	9.6		
American Indian	6	5.2		
Asian	1	0.9		
Missing Data	2	1.7		
Community of Origin				
Small Farm/Ranch	22	19.1		
Rural Area, but Not on a Farm or Ranch	12	10.4		
Small Town: < 5,000	15	13.0		
Small City or Suburb: 5,000 to 50,000	35	30.4		
Urban Area, City: > 50,000	28	24.3		
Missing Data	3	2.6		
Classification Level in College				
First-Semester Freshman	5	4.3		
Freshman	19	16.5		
Sophomore	29	25.2		
Junior	33	28.7		
Senior	29	25.2		

Note. [a]Range = 18 to 39; Mode = 21

The five principal factors investigated were 1) exposure to agriculture, 2) family and friends, 3) college of agriculture recruitment activities, 4) professionals, and 5) job considerations. Data for each of the principal factors are presented in Tables 2, 3, 4, 5, and 6, respectively. Sub-items to each factor are illuminated if respondents' modal response for their perceived level of influence was "very influential" and/or had a mean ranking score of 3.0 or greater.

Table 2 displays experiences related to exposure to agriculture and are arranged in descending order of influence. It was found that students perceive prior experience in agriculture (i.e., farm/ranch work, agriculture-related job), other agriculture experiences (i.e., FFA/4-H activities related to agriculture), and relatives in agriculture most influential to them when selecting an agricultural major. Each of these sources of influence has a modal category of "very influential" and a mean ranking score greater than 3.0. Conversely, items having a modal category of "not influential" were not perceived by respondents to be much of an influence in selecting a major in agriculture (Table 2).

Table 2
Students' Perceptions of Exposure that Influence Selecting a Major (n=115)

	Level of Influence (%)[a]							
Exposure to Agriculture	N	S	Sw	Mo	V	N/A[b]	M	SD
Prior Experience in Ag	17.5	1.0	13.4	17.5	50.5	18	3.8	1.50
Other Ag Experiences	21.5	5.1	12.7	12.7	48.1	24	3.6	1.62
Relatives in Agriculture	27.6	9.2	4.6	17.2	41.4	27	3.4	1.71
Ag Courses in High School	39.1	16.3	12.0	10.9	21.7	23	2.6	1.60
TV Programs About Ag	33.0	18.3	28.4	11.0	9.2	6	2.5	1.30
Technical Journals Focused on Agriculture	38.8	22.3	18.4	14.6	5.8	12	2.3	1.28
Newspapers About Ag	38.2	25.5	22.7	10.9	2.7	4	2.1	1.13
Non-Technical Magazines About Ag	41.5	22.6	21.7	10.4	3.8	9	2.1	1.18
Radio Broadcasts About Agriculture	60.4	21.7	16.0	1.9	0.0	8	1.6	0.83

Note.
[a]N(Not)=l; S(Slightly)=2; Sw(Somewhat)=3; Mo(Moderately)=4; V(Very)=5
[b]N/A=Not Applicable; This represents the frequency and was not calculated into the percent level of influence.

Table 3 presents items representing family and friends as sources of influence in selecting a major in agriculture. Only one source, personal role model, had a mean ranking score greater than 3.0. However, respondents were polarized on their perception of this source as an influence. Approximately 40 percent of the respondents indicated that having a personal role model was "not influential" in selecting an agricultural major, whereas 39 percent indicated that a personal role model was "very influential." Parent(s)/guardian(s), other relatives, college friend, high school friend and sibling as sources of influence yielded a "not influential" modal response from respondents.

ERIC Full Text Provided by ERIC

Table 3
Students' Perceptions of Family and Friends that Influence Selecting a Major (n=115)

	Level of Influence (%)[a]							
Family and Friends	N	S	Sw	Mo	V	N/A[b]	M[a]	SD
Personal Role Model	40.2	3.7	6.1	11.0	39.0	30	3.1	1.83
Parent(s)/Guardian(s)	29.8	16.7	17.5	15.8	20.2	1	2.8	1.52
Other Relatives	47.3	19.1	12.7	9.1	11.8	5	2.2	1.42
College Friend	52.3	8.4	15.9	15.9	7.5	8	2.2	1.41
High School Friend	53.7	11.1	16.7	11.1	7.4	7	2.1	1.35
Sister or Brother	57.3	14.6	14.6	8.7	4.9	12	1.9	1.23

Note.
[a]N(Not)=l; S(Slightly)=2; Sw(Somewhat)=3; Mo(Moderately)=4; V(Very)=5
[b]N/A=Not Applicable; This represents the frequency and was not calculated into the percent level of influence.

Students' perception of college recruitment activities that influenced their decision in selecting an agricultural major are presented in Table 4. Only faculty's friendliness in their choice of major and the overall friendly atmosphere in the college of agriculture were perceived to be influential in students' choice of major. Each generated a "very influential" modal response category and a mean ranking score greater than 3.0. The remaining items in table 5 did not meet this criteria and thus were not considered to be influential in respondents' choice of major.

Table 4
Students' Perceptions of College Factors that Influence Selecting a Major (n=115)

	Level of Influence (%)[a]							
Sources of Influence	N	S	Sw	Mo	V	N/A[b]	M[a]	SD
Department Faculty's Friendliness	15.2	9.8	20.5	26.1	27.0	3	3.4	1.39
Friendly Atmosphere in College of Agriculture	16.7	6.1	27.2	21.9	28.1	1	3.4	1.39
Teaching Reputation of Department	31.3	7.1	19.6	19.6	22.3	3	2.9	1.56
Teaching Reputation of Major's Professors	31.3	9.8	18.8	15.2	25.0	3	2.9	1.59
Teaching Reputation of Ag Professors	32.7	10.9	19.1	20.0	17.3	5	2.8	1.51
Informational Pamphlets About Major	30.3	15.6	18.3	23.9	11.9	6	2.7	1.42
Personal Visit with a Representative from College of Agriculture	41.9	9.7	15.1	17.2	16.1	21	2.6	1.56
Agriculture-Related Clubs/Activities	45.2	8.7	10.6	19.2	16.3	11	2.5	1.60
Informational Pamphlets about College of Ag	39.1	14.5	24.5	12.7	9.1	5	2.4	1.35
Scholarship(s) from Department	61.9	12.4	7.2	6.2	12.4	18	1.9	1.44
Other Financial Incentives	63.4	9.8	8.5	9.8	8.5	30	1.9	1.38
High School Visits from College Representatives	64.2	4.9	17.3	7.4	6.2	34	1.9	1.30
College of Ag Alumni	71.3	8.9	8.9	6.9	4.0	14	1.6	1.15
College of Ag Recruiting Receptions	71.4	12.1	6.6	5.5	4.4	24	1.6	1.12
Radio Broadcasts About College of Agriculture	79.1	15.4	5.5	0.0	0.0	24	1.3	0.55

When participants were given a choice of professionals who could have influenced them (Table 5), professionals in agriculture fields were identified most frequently as being "very influential" in selecting an agriculture major, yielding a mean rank score of 3.3. Professionals whose mean rank score was less than 3.0 and whose modal response category was "not influential" in selecting an agriculture major were Extension professionals, high school science teacher, vocational agriculture teacher, other high school teachers, high school counselor, and high school principal.

ERIC Full Text Provided by ERIC

Table 5
Students' Perceptions of Professionals' Influence in Selecting a Major ($\underline{n}$=115)

	Level of Influence (%)[a]							
Professional	N	S	So	Mo	V	N/A[b]	$\underline{M}^a$	SD
Ag Professionals	25.7	5.7	12.4	22.9	33.3	10	3.3	1.60
Extension Professionals	53.4	12.5	6.8	9.1	18.2	27	2.3	1.60
High School Science Teacher	46.4	15.2	15.2	12.5	10.7	3	2.3	1.40
Vocational Ag Teacher	57.3	11.2	12.4	2.2	16.9	24	2.1	1.52
Other High School Teachers	61.0	8.6	15.2	7.6	7.6	10	1.9	1.33
High School Counselor	76.4	10.4	8.5	2.8	1.9	9	1.4	0.91
High School Principal	81.7	6.4	7.3	2.8	1.8	6	1.4	0.88

Note.
[a]N(Not)=l; S(Slightly)=2; So(Somewhat)=3; Mo(Moderately)=4; V(Very)=5
[b]N/A=Not Applicable; This represents the frequency and was not calculated into the percent level of influence.

The most influential job considerations (Table 6) when selecting a major as perceived by respondents were opportunities to work outdoors, do field work, work with animals, location of career opportunities, future job market, and working with people and/or plants. The modal category for the level of consideration for each of these items was "high"; each having a mean ranking score greater than 3.0. Potential income gained after college generated "somewhat" to "moderate" considerations from respondents. However, respondents did not perceive the prestige of the career area as a consideration for selecting a major.

ERIC Full Text Provided by ERIC

Table 6
Considerations Students' Perceive as Influential in Selecting a Major (n=115)

	Level of Consideration (%)[a]						
Consideration	N	S	So	Mo	H	M[a]	SD
Working Outdoors	3.5	0.9	6.1	17.4	72.2	4.5	0.92
Field (out-of-office) Work	4.3	0.9	10.4	18.3	66.1	4.4	1.02
Working with Animus	18.3	3.5	11.3	14.8	52.2	3.8	1.55
Location of Career Opportunities	7.0	8.7	23.5	24.3	36.5	3.7	1.23
Future Job Market of the Career Area	3.5	10.4	32.2	27.0	27.0	3.6	1.10
Working with People	4.3	10.4	33.9	25.2	26.1	3.6	1.12
Working with Plants	21.7	9.6	20.9	17.4	30.4	3.3	1.52
Potential Income After College	9.6	20.0	26.1	27.8	16.5	3.2	1.22
Prestige of Career	27.0	16.5	38.3	8.7	9.6	2.6	1.24

Note. [a]N(Not)=l; S(Slight)=2; So(Some)=3; Mo(Moderate)=4; H(High)=5

CONCLUSIONS. RECOMMENDATIONS. AND IMPLICATIONS

A myriad of sources influence students' choice of academic major in agriculture. These data direct attention to sources that are very influential in this process. The data also identify sources that are not perceived to be very influential in students' choice of major. When compared to the selected sources of influence, "prior experiences" in agriculture was the highest ranked influence for selecting an agriculture major. This finding supports Donnermeyer and Kreps (1994), who found that Ohio State University students also were influenced by prior experience in agriculture. Having other experiences in agriculture through 4-H or the FFA Organization, or being associated with relatives who are involved in agriculture also surfaced as experiences that influence students' choice of major.

It is further concluded that the friendliness of departmental faculty and the overall friendly atmosphere in the college of agriculture led to selecting a career area in agriculture. Persons who also influenced students' decision in selecting a major in an agricultural career area were professionals employed in agriculture and personal role models. Additionally, job considerations influence students' choice of major. Students consider working outdoors and out-of-office field work most influential. Other important considerations were working with animals, future job market, and location of employment opportunities. These findings also have been found important to other agriculture students and are supported by Rawls, Martin, Negatu, and Robertson (1994).

These data provide guidelines for faculty in agricultural education and others who seek to boost enrollment. Many students who choose a major in agriculture have prior experience and knowledge about agriculture. These students may have been exposed to some type of agriculture experience such as living on a farm or ranch, being involved with FFA and 4-H, hunting, and

ERIC

working with animals. To increase enrollment, recruitment need to continue focusing efforts on students who have had these and related agriculture experiences.

Perhaps more challenging, however, is to recruit students who have not been exposed to or had prior agriculture experiences. The challenge is to increase these students' knowledge and awareness level about employment opportunities in agriculture. This may be accomplished by promoting existing agriculture literacy programs that target youth at various levels. Among others, such programs include Agriculture in the Classroom, Food for America, and Cow Belles.

The National Research Council (1996) estimates a shortage of qualified persons to fill positions in the modern U.S. food and agriculture system. To attract students to agriculture, as youth enter high school, they should be made aware of the various and numerous opportunities in agriculture by implementing career fair presentations to the general student body. Participants should include professionals in diverse areas of agriculture and representatives from departments in colleges of agriculture. Additionally, School-to-Work programs should be incorporated, allowing students to participate in experiential activities related to agriculture career interests.

With a shortage of professionals in agricultural education, faculty in agricultural education should actively promote and participate in these activities. As such, faculty should communicate to students the job considerations related to various career choices in agricultural education.

While the results of this research are unique to this university, these data also offer implications for general recruitment efforts. These data may have importance at the state or national level for recruiting high school students into agricultural education and colleges of agriculture. Also, although the information presented is specific to agricultural career interests, persons involved in recruitment efforts in other areas may also use these findings as a guide for developing and implementing related activities.

Furthermore, the study not only provide useful information on basic factors that influence a student in choosing a major in agriculture, but also provides useful information on items that do not appear to influence students' decision on a career choice. Consumers of these findings should evaluate these data for effectiveness in their recruitment efforts.

Moreover, this study provides a baseline of data that may contribute to future recruiting decisions and provide information for further research in this area.

REFERENCES

Dillman, D. A (1987). Mail and telephone survey. J. Wiley and Sons, New York.

Donnermeyer, J. F., & Kreps, G. M. (1994). Assessing college of agriculture freshmen. NACTA-Journal. 38(1), 45-48.

Fisher, T. A., & Griggs, M. B. (1995). Factors that influence the career development of African-American and Latino youth. Journal of Vocational Education Research, 20 (2), 57-75.

Jackman, W. J., & Smick-Attisano, R. A. (1992). Qualitative and quantitative methods add depth to recruiting study. NACTA-Journal. 36 (1), 46-50.

Kunkel, H. H., Maw, I. L., & Skaggs, C. L. (Eds.). (1996). Revolutionizing Higher Education in Aariculture' Framework for Change. Ames, Iowa: Robson & Associates.

Mallory, M. E., & Sommer, R. (1986). Student images of agriculture: Survey highlights and recommendations. Journal of the American Association of Teacher Education in Agriculture. 27 (4), 15-17.

Molnar, J. J., & Dunkelberger, J. E. (1981). The expectation to farm: An interaction of background and experience. Rural Sociology, 46 (1), 62-84.

National Research Council (1988). Understanding agriculture: New directions for education. Washington, DC: National Academy Press.

National Research Council (1996). Colleges of agriculture at the land operant universities: Public service and public policy. Washington, DC: National Academy Press.

THE UNIVERSITY. (1996). 1996-97 THE UNIVERSITY Undergraduate Catalog. Vol: 90(3).

Rawls, W. J. (1995). Cluster analysis of students' interest in work-traits related to careers in the food and agricultural sciences. NACTA-Journal. 39 (1), 54-57.

Rawls, W. J., Martin, A., Negatu, S., & Robertson, M. (1994). Educational plans of minority student participants in a university food and agricultural sciences recruitment program. NACTA-Journal. 38 (4), 15- 19.

Schuster, C. P., & Costantino, P. (1986). Using marketing research to develop student recruiting strategies. NACTA-Journal. 30 (2), 4-8.

SELECTING A MAJOR IN AGRICULTURE: IMPLICATIONS FOR RECRUITMENT IN AGRICULTURAL EDUCATION

A Critique

David E. Lawver
Texas Tech University

This study addressed factors that encourage/discourage selection of a major in agriculture. In the introduction of the paper, the researchers discuss the declining enrollment that many colleges of agriculture are experiencing across the United States. It is pointed out that although student numbers are declining, there is a demand for quality agricultural scientists and professionals. A review of literature revealed five principal factors that serve to influence the selection of majors in agriculture. Those factors were 1) exposure to agriculture, 2) family and friends, 3) college of agriculture recruitment activities, 4) professional, and 5) job considerations. The researchers acknowledged that an assortment of factors influence students' decisions to select a major in a college of agriculture.

The purpose and objective of the study were clearly stated. The researchers used questionnaires that were developed using Dillman's Total Design Method. A test-retest approach was used to establish the reliability of the instrument. The survey instruments were distributed to 13 randomly selected intact groups that represented lower division agriculture classes at New Mexico State University. A total of 115 (unduplicated) students participated in the study.

In reviewing the paper, a couple of concerns or questions surfaced. It is reported in the paper that all students in the 13 classes (intact groups) were allowed to complete the survey but questionnaires from students not meeting the target population description were eliminated from the study. It was unclear to this discussant as to what the target population description was and why it was necessary to eliminate research subjects. The second concern/question deals with the scaling of the instrument. The researchers chose to scale the instrument with N (not influential)= 1; S (slightly influential)= 2; So (somewhat influential)= 3; Mo (moderately influential)= 4; and V (very influential)= 5. To this reviewer, there is very little difference between somewhat influential and moderately influential. Perhaps other descriptors could have been used.

The researchers report some intriguing findings, especially for college factors influencing major selection. For example, two low-cost/no-cost factors, "Department Faculty's Friendliness" and "Friendly Atmosphere in College of Agriculture" were perceived by students to have the highest level of influence. Conversely, factors that are traditionally thought to be effective recruitment techniques such as "Scholarship(s) from Department," "Other Financial Incentives, "and" High School Visits from College Representatives were perceived to have less influence. What recommendations do the researchers have in regard to capitalizing on this finding? Additionally, the "Vocational Agriculture Teacher" was perceived to have a low level of influence. What are the implications of this finding?

ERIC Full Text Provided by ERIC

This research represents an area of deep concern for administration and faculty in colleges of agriculture. Although the findings of this study are not generalizable to other universities, this study could be replicated to meet their specific needs. Overall this research provides some helpful information which should guide the faculty and administration at New Mexico State University as they consider their recruitment efforts. The authors of this paper should be commended for a job well done.

ERIC

An Assessment of Agricultural Literacy in K-8 Schools



Carl G. Igo
Southwest Texas State University

James Leising
Oklahoma State University

Martin Frick
Montana State University

INTRODUCTION

In 1988 the National Research Council's Committee on Agricultural Education in Secondary Schools proposed that an agriculturally literate person would understand the Food and Fiber System in relation to its history, economic, social, and environmental significance (National Research Council, [NRC] 1988). The committee also recommended that "all students should receive at least some systematic instruction about agriculture beginning in kindergarten or first grade and continuing through twelfth grade" (NRC, 1988, p.10).

Frick, in 1990, reported one of the first widely published agricultural literacy definitions: "Agricultural literacy can be defined as possessing knowledge and understanding of our food and fiber system. An individual possessing such knowledge would be able to synthesize, analyze, and communicate basic information about agriculture." (p. 52).

Much of the focus on agriculture literacy has been on the development of instructional materials. Again looking to the NRC (1988) report, "the material tends to be fragmented, frequently outdated, usually only farm oriented, and often negative or condescending in tone" (p. 9). In evaluating the Georgia Agriculture in the Classroom program, Herren and Oakley (1995) concluded the materials were effective with both urban and rural students. Swortzel, (1996) reported an Ohio study assessing fourth-graders knowledge of animal agriculture. A pretest/posttest design was used and a statistically significant difference was shown between the

two test scores with greater gains for students living in urban areas. Trexlar (1997) concluded the introduction of an agriculturally based science curriculum "did not alter or negatively effect student perceptions of science, agriculture or their agri-science knowledge level" (p. 19).

Nunnery (1996) noted the necessity for building a literacy framework for understanding agriculture's perspectives and viewpoints. Leising and Zilbert (1994) approached agricultural literacy from this angle. They developed a systematic curriculum framework identifying what students should know or be able to do. The Food and Fiber Systems Framework explained what an agriculturally literate high school graduate should comprehend. Using a series of standards in five thematic areas, the framework delineated the necessary components for understanding the way food and fiber systems relates to daily life. Breaking the standards into grade-grouped benchmarks, K-1, 2-3, 4-5, and 6-8, the Framework provided a systematic means of addressing agricultural literacy.

One point of contention facing agricultural literacy was the most appropriate and least intrusive way to incorporate instruction into an already overloaded curriculum (Law, 1990). The Food and Fiber Systems Literacy Framework was designed to make connections to agricultural concepts through existing curriculum and academic standards. The research problem was whether education about agriculture effectively can be infused into core academic learning using the Food and Fiber Systems Literacy Framework as the guide for instruction.

PURPOSE AND OBJECTIVES

The purpose of this study was to assess food and fiber knowledge of selected students in kindergarten through eighth grade before and after receiving instruction based upon the Food and Fiber Systems Literacy (FFSL) Framework standards and benchmarks. For this research, the specific objectives included:

1. Develop a profile of the test site schools included in this research.
2. Assess students' knowledge of Food and Fiber Systems before and after receiving instruction based upon the Food and Fiber Systems Literacy Framework.
3. Determine differences by grade grouping (K-1, 2-3, 4-5, 6-8) in student knowledge about agriculture before and after instruction based upon the Food and Fiber Systems Literacy Framework.
4. Determine grade-grouping differences in student knowledge about agriculture before and after instruction based upon the five thematic areas of the Food and Fiber Systems Literacy Framework.
5. Determine if a relationship existed between the differences in student knowledge about agriculture before and after instruction based upon the Food and Fiber Systems Literacy Framework and the number of teacher reported instructional connections to the Framework.

ERIC Full Text Provided by ERIC

METHODS AND PROCEDURES

Case study methodology was used for this research. The case studies involved one K-8 school in each of three states: California, Montana, and Oklahoma. The sites were chosen based on diversity and school size. The case studies included 366 students, 177 students, and 257 students, respectively. The Montana and Oklahoma cases involved the kindergarten through eighth grade students and teachers. The California study included students and teachers from first, second, third, fourth, seventh, and eighth grades. Each site used an infusion approach, with teachers integrating Food and Fiber Systems instruction into core academic subjects.

Instructional Materials Development

To enable teachers to implement the Project at each test site, the Project staff developed a series of lesson plans and instructional activities supporting the Framework. Following an in-depth review, the staff found lessons and activities available from a variety of sources. Upon review of those materials, the decision was made to adapt existing lessons to align with the Framework. The goal was to provide to teachers lesson examples for infusing agricultural concepts into their core academic subject matter and encourage connections to the Framework from existing instruction.

Teacher Training

Preparing teachers to use the Food and Fiber Systems Literacy Framework was completed in two phases. Phase I training at each site involved a Project overview, followed by orientation to the Framework, standards and benchmarks and the introduction of the supporting lessons and activities. Phase I training also included hands-on activities for teachers. Phase II training included time for teachers to become familiar with the Project web site, including instruction on submitting electronic reports to the Project staff. The majority of Phase II was spent in helping teachers plan instructional time throughout the academic year to address Food and Fiber Systems concepts.

Instrumentation

Instruments were developed to measure Food and Fiber Systems knowledge for each grade grouping in the Framework: K-1, 2-3, 4-5, and 6-8. Questions on each instrument were based on the grade-grouped benchmarks. The K-1 and 2-3 instruments included 16 and 21 items respectively. Both primarily used a format consisting of questions to be read by the teacher followed by a series of illustrations from which the students were to pick the correct answer(s). The K-1 instrument responses were entirely pictures, while the 2-3 instrument used picture and simple text responses. The 4-5 and 6-8 grade level instruments contained 35 and 30 text-responses respectively.

Curriculum specialists and elementary teachers reviewed the instruments for age-level, reading-level, and vocabulary-level appropriateness to ensure content validity. Additionally, the instruments were reviewed for agricultural content by a panel of experts. Based upon input from those reviews, the instruments were revised. The instruments were again reviewed by project staff to ensure the items were based upon the appropriate grade-level benchmark and content.

A pilot test was conducted with a K-8 student population in a Montana school. Following administration of the instruments, teachers were asked to provide input for the improvement of the

ERIC Full Text Provided by ERIC

instruments based upon their expertise and the observed responses of their students.

A Guttman Split-Halves reliability coefficient was computed on the instruments using the Statistical Package for Social Sciences (SPSS) software. The reliability coefficient for the K-1 instrument was computed at 0.7763, and the reliability coefficient for the 2-3 instrument was computed at 0.9469. The 4-5 instrument yielded a Guttman Split-Halves reliability coefficient of 0.7892, and the 6-8 instrument yielded a reliability coefficient of 0.7879. The instruments were minimally revised and some items were reworded based upon input from the teachers.

Data Collection

The pre-test was given at each site during the first week of October 1997, prior to any Food and Fiber Systems instruction. Teachers administered the pre-tests in their own classrooms. The post-test was similarly administered at the sites during the week of May 5, 1998.

Feedback regarding the connections made to the Framework was solicited from the teachers throughout the Project year. Teachers were expected to report a minimum of two food and fiber related lessons or connections per month and to submit reports to the Project staff.

Qualitative data were gained through the assistance of school administrators. Additionally, the researcher was provided demographic information about the schools based upon copies of documents submitted for state and federal funding. Information was also gleaned from the Chambers of Commerce in each community. The researcher made qualitative observations during site visits throughout the Project year.

Analysis of Data

After administration, the tests were scored and coded into a Microsoft™ Excel spreadsheet for analysis. Means and percentiles were computed by grade-level grouping for the test scores from both sites. Test mortality accounted for 193 fewer students tested at the California site, 14 fewer students tested at the Montana site, and 11 fewer students tested at the Oklahoma site. Analysis of variance procedures were performed using SAS version 6.11 to determine differences in pretest and posttest knowledge scores. The analyses included the General Linear Models procedure and computation of Least Squares Means to delineate differences by theme area of the Food and Fiber Systems Literacy Framework. A Pearson's Product Moment Correlation was computed to assess relationships between pre- and posttest differences and the number of teacher reported instructional connections to the Framework.

RESULTS/FINDINGS

Profile of California Site

Community and school.

The California school was in a community with a population of 40,000. The community was the government seat of a county with a population over 140,000. The county was heavily agricultural, with large vegetable and grain farms, as well as fruit orchards and vineyards.

The California school site consisted of a unified school district with multiple elementaries, two junior highs and one high school. Students from one elementary with its feeder junior high were used in the study. Just over 30 percent of students were identified for special services, such as special education or Title programs. Each of the two campuses had a free and reduced lunch eligibility rate just over 55 percent. The transiency rate for the district was over 20 percent for the 1996-97 year.

The elementary school included kindergarten through sixth grade using a multi-grade, multi-age concept. The school also was a Spanish Immersion school. Two 1st-2nd non-Spanish combinations, one 3-4 non-Spanish combination, and one 3-4 Spanish immersion class participated in the case study. The junior high was departmentalized and students were grouped using a village approach so that all students in a "village" had the same core academic teachers. One seventh-grade and one eighth-grade village participated in the case study.

Instructional Connections observed.

The teachers in California seemed to have difficulty making both formal and informal connections to Food and Fiber Systems. During visits to the elementary school, the researcher observed students involved in a Native American unit drying fruit. However, the teacher did not see the lesson as a connection to the Framework. On another occasion, the researcher observed students creating art projects using various kinds of seeds; again the teacher had not made the connection. Similar difficulties were encountered at the junior high. The science teachers commented on the difficulty in meeting state and district mandates and having time to get in any extra lessons related to Food and Fiber Systems. However, one math teacher and one social studies teacher did exemplary jobs of not only using materials provided, but also connecting much of their textbook activity to the standards and benchmarks. One special-education resource teacher also found numerous opportunities to relate life skill activities such as meal planning and budgeting to Food and Fiber Systems.

Profile of Montana Site

Community and school.

The Montana school was in a community with a population of 1635. The community was also the county seat. The county population was near 3500. The county had several industries, including timber and mining. The county's main agricultural crops included wheat and beef cattle.

The Montana school consisted of an elementary, junior high, and high school. There were 550 students enrolled in grades K-8 for the 1997-1998 academic year. Approximately 30 percent

of the students were enrolled in special services such as Title I or Special Education. The school had 51 percent student free and reduced lunch eligibility and a 19 percent transient rate for the 1997-1998 academic year.

The elementary school included kindergarten through sixth grade. The school utilized half-day kindergarten programs with two teachers. Each of the other grades had two classrooms per grade level as well. One teacher at each grade level participated in the Food and Fiber Systems Literacy Project. The junior high utilized a departmental approach with the students traveling to teachers in different classrooms for the various subjects. The two science teachers at the junior high were primarily responsible for delivering course content related to the Food and Fiber Systems Project. The eighth grade science teacher also served as the junior high principal.

Instructional connections observed.

The teachers at the Montana site made many informal connections to Food and Fiber Systems in addition to the formal instruction for which reports were presented. Teachers' rooms were decorated with seasonal decorations as well as examples of student work relating to Food and Fiber Systems. On one visit, the researcher observed the pumpkins and apples from a fall harvest unit the teachers were completing. On another visit, the researcher observed the results of a wool processing lesson. During one visit, the researcher observed students dramatizing Eric Carle's The Very Hungry Caterpillar. During an early spring visit, the researcher noted students studying birds. Besides making bird nests, they had displayed reports on the different kinds of birds in Montana and ways those birds helped or harmed agriculture producers and processors. One teacher reported that the students had really enjoyed making ice cream in plastic bags and applying what they had learned to principles of science. During the May 1998 visit, the researcher observed students drawing correlations between the diets of the family described in The Diary of Anne Frank and current daily recommendations in the USDA Food Guide Pyramid.

Profile of Oklahoma Site

Community and school.

The Oklahoma community had a population of almost 1400. The county population was near 62,000. The city was one of seven incorporated communities in the county. Near one of the oil and natural gas producing centers of Oklahoma, petroleum and agriculture have traditionally been the basis of the area's economy. Many of the residents of the community traveled to nearby cities for employment.

The schools of the Oklahoma site consisted of two separate campuses. The elementary school contained kindergarten through sixth grade. The junior high and high school were combined on one campus. Elementary enrollment was 246, while enrollment in grades 7-12 was 248. Just over 50 percent of the student population qualified for the free and reduced lunch program. The transient rate for the 1997-1998 school year was 13 percent and 22 percent of the students received services such as speech or special education.

Instructional connections observed.

Teachers decorated their rooms around an agricultural theme. Teachers used a peanut plant for a discussion of peanuts, tying it to a lesson on George Washington Carver. One of the

projects undertaken by the school was the creation of a raised-bed garden. The principal secured the donation of surplus railroad ties and the fifth and sixth grades took on the project. One teacher reported that students really enjoyed the application of math, science, language arts, and visual arts in the process of planning the garden. During visits with the teachers at the junior high, the researcher observed that more agricultural connections were being made than were being reported. Both teachers were using agricultural examples in relating subject matter to students, but when questioned about those connections, the teachers seemed surprised to learn that connections could have been made. Many of the teachers in the Oklahoma case study seemed to struggle with the concept of infusing food and fiber concepts into existing instruction.

Pretest and Posttest Grade Grouping Analysis

The pretest and posttest food and fiber knowledge scores for students were reported in Tables I, II, and III. Numbers of respondents and mean test scores were provided for each grade grouping. Each table also indicated pre- and posttest score differences and the significance levels for those differences, as determined by Analysis of Variance.

Table 1 provides the results from the California test site. The K-1 mean group scores of that site increased 2.5 points and the 4-5 mean group scores increased almost six points. The K-1 mean score differences were not statistically significant at the 0.05 level. With larger participating student numbers, the 2-3 mean score differences were statistically significant. There was no 4-5 group at the California site. Both the third-fourth combination teachers gave the 2-3 test to all students in their classes. Also, there was no participating sixth grade at the California site; the 6-8 grade grouping was made up entirely of seventh and eighth graders. Within this group, the mean score actually dropped 2.5 points and standard deviation produced an F-value over 20, thus showing significant statistical difference at the 0.05 level.

Table 1
California Students' Food and Fiber Knowledge Levels As Measured By Pretest And Posttest Scores

	Pretest		Posttest				
Grade	n	mean	n	mean	difference	F-value	p
K-1	15	54.8	12	57.3	+2.5	0.86	0.3555
2-3	42	71.0	39	76.8	+5.8	8.83	0.0032*
4-5[a]							
6-8[b]	502	31.8	315	29.3	-2.5	21.45	0.0001*

Note. df for all calculations was 1. *p<0.05
[a] There was no 4-5 component in CA
[b] There were no 6th grade participants in CA

Table 2 similarly illustrates the data from the Montana site. The mean score for the K-1 grade group increased almost 17 points and yielded an F-value of almost 75, showing statistical significance. At grade grouping 2-3, the mean score increased almost 14 points, the F-value computation was 46. At the 4-5 grade group, the mean score increased four points and the F-value was over 5. The Montana mean knowledge score between the pretest and the posttest decreased 1.3 points in the 6-8 grade grouping, and also yielded a relatively small F-value. All grade groups except 6-8 showed statistically significant differences in pre- and posttest knowledge scores.

ERIC Full Text Provided by ERIC

Table 2
Montana Students' Food and Fiber Knowledge Levels As Measured By Pretest And Posttest Scores

	Pretest		Posttest				
Grade	n	Mean	n	Mean	Difference	F-value	p
K-1	54	72.1	50	88.8	+16.7	74.75	0.0001*
2-3	38	75.6	35	89.4	+13.8	46.28	0.0001*
4-5[a]	49	67.2	47	71.2	+4.0	5.13	0.0239*
6-8[b]	50	63.7	45	62.4	-1.3	0.23	0.6315

Note. df for all calculations was 1. *p<0.05

Table 3 provides the pretest and posttest data for the Oklahoma site. The K-1 group mean score increased almost nine points from the pretest to the posttest, yielding an F-value of 21.33. In the 2-3 grouping, the mean score increased just over nine points with a 41.24 F-value. At grade grouping 4-5, the posttest mean score increased 6.6 points, and the F-value was over 15. The 6-8 grade group posttest score decreased almost three points, and returned an F-value of 1.53. Once again, all grade groups except 6-8 showed a statistically significant difference in pre- and posttest knowledge scores.

Table 3
Oklahoma Students' Food And Fiber Knowledge Levels As Measured By Pretest And Posttest Scores

	Pretest		Posttest				
Grade	n	Mean	n	Mean	Difference	F-value	p
K-1	53	77.3	53	86.1	+8.8	21.33	0.0001*
2-3	73	79.3	72	88.4	+9.1	41.24	0.0001*
4-5[a]	75	66.1	74	72.7	+6.6	15.11	0.0001*
6-8[b]	67	57.9	58	55.0	-2.9	1.53	0.2157

Note. df for all calculations was 1. *p<0.05

THEMATIC AREA ANALYSIS

The Food and Fiber Systems Literacy Framework was organized around five thematic areas: Food and Fiber Systems—Understanding Agriculture; History, Culture, and Geography; Science—Agricultural and Environmental Interdependence; Business and Economics; and Food, Nutrition and Health. Since the California, Montana, and Oklahoma case studies all used an infusion approach to implementing Food and Fiber Systems literacy, each site's data were combined to provide a composite view of the thematic area analysis. That composite information was presented in Table 4. With only two exceptions, all grade groups within each theme area showed statistically significant differences between pre- and post test results. Within the Science and Environment theme, the 2-3 grade-group produced a zero F-value, which yielded a 0.98 significance score. The 6-8 group, within the Business and Economics theme, also showed no statistical significance, producing an F-value of less than one.

ERIC Full Text Provided by ERIC

Table 4
F-Value Comparison Of Composite Pretest And Posttest Differences By Grade Groups Within Theme Areas For California, Montana, and Oklahoma Sites

Theme and group	F-value	p
Understanding Agriculture		
K-1	15.5	0.0001*
2-3	11.01	0.0001*
4-5[a]	42.71	0.0001*
6-8	19.54	0.0001*
History, Culture, and Geography		
K-1	1108.58	0.0001*
2-3	33.33	0.0001*
4-5[a]	52.83	0.0001*
6-8	290.48	0.0001*
Science and Environment		
K-1	202.96	0.0001*
2-3	0.00	0.9820
4-5[a]	79.96	0.0001*
6-8	14.09	0.0002*
Business and Economics		
K-1	4.80	0.0295*
2-3	22.56	0.0001*
4-5[a]	18.76	0.0001*
6-8	0.40	0.5254
Food, Nutrition, and Health		
K-1	59.88	0.0001*
2-3	145.27	0.0001*
4-5[a]	24.21	0.0001*
6-8	5.92	0.0151*

Note. df for all calculations was 1. *$p<0.05$

[a] there was no 4-5 component in CA – data represent only MT and OK

Correlation Analysis

Pearson's Product Moment Correlation Coefficients were computed using SAS to assess whether a relationship existed between the difference in pretest and posttest knowledge scores and the number of instructional connections that teachers made to Food and Fiber Systems. Those instructional connections were based upon feedback provided by teachers as a part of the Food and Fiber Systems Literacy Project. Table 5 indicates the result of the analysis. Both the Montana site and the Oklahoma site showed a strong correlation, 0.621 and 0.586, respectively between the pre- and posttest score differences and the number of instructional connections made by teachers. However, a significant statistical difference occurred only for the Oklahoma site. Pooling the Montana and Oklahoma data to create a composite yielded a 0.603 correlation coefficient and the computed difference was statistically significant as well.

Table 5
Correlation Of Differences In Pretest And Posttest Scores To Instructional Connections By Site

Site	n	Pearson r	p
Montana	8	0.621	0.1003
Oklahoma	13	0.586	0.0353*
Composite	21	0.603	0.0038*

*$p<0.05$

With the data pooled, seven classrooms yielded decreases in percentage score differences from pre- to posttest while 14 classrooms showed increases in knowledge scores. Thirteen classes knowledge difference scores increased by 5 percent or more. Knowledge score increases of 10 percent or better were seen when the number of reported connections rose to 20 or above. California data were not included in the correlation due to structural differences between the California school and the other two schools. The California school did not include all grade levels and was based on a village concept. The California teachers did submit reports, however the village concept prevented possible correlations between a particular group or class of students and the number of instructional connections those students received.

Major Findings

Objective 1. A profile of the test sites revealed several similarities between the schools. Both the Montana and Oklahoma sites utilized half-day kindergarten programs. All used intact classrooms from kindergarten through sixth grade. The junior highs at each site were departmentalized. California, Montana, and Oklahoma, all public school sites, reported free and reduced lunch percentages over 50 percent.

There were also several unique qualities associated with each site. The Montana case study had a smaller range of student ethnicity than any other site. The Montana site was the only incorporated community in the county. The California and Oklahoma sites each were one of several communities in the county.

Objective 2. California students had a cursory knowledge of Food and Fiber Systems prior to receiving instruction, with pretest grade-grouped mean scores ranging from 32 to 71 percent. Scores increased minimally from pretest to posttest, with posttest mean scores ranging from 29 to 77 percent.

Prior to receiving instruction based upon Food and Fiber Systems, students in Montana had some knowledge of agriculture, with pretest grade-grouped mean scores ranging from 64 to 76 percent for the four grade groupings. Grade-grouped mean scores were generally higher after receiving instruction. The posttest mean scores in Montana ranged from 62 to 89 percent.

Oklahoma students also had some existing knowledge of Food and Fiber Systems, based upon the pretest scores. Means for the pretest ranged from 58 to 79 percent for the four grade groupings. Posttest means were higher in all but the 6-8 grade group. The Oklahoma posttest means ranged from 55 to 88 percent.

ERIC

Objective 3. The California students posttest scores for grade groups K-1 and 2-3 were higher than pretest scores, with the 2-3 group scores significantly different at the 0.05 level. Both the Montana students' and Oklahoma students' posttest scores were higher than pretest scores for grades K-5, and each group was significantly higher statistically. The posttest scores for 6-8 students in California, Montana, and Oklahoma were lower than pretest scores, with the California groups' scores showing statistically significant difference.

Objective 4. Statistically significant pre- and posttest mean differences were found in grade-groupings across all five thematic areas of the Food and Fiber Systems Literacy Framework. In fact, in three theme areas, those differences occurred across all grade-groups. The Science and Environment theme showed no statistical significance at the 2-3 grade group and the Business and Economics theme showed no significance at the 6-8 grade group.

Objective 5. Teacher reported connections to the Food and Fiber Systems Literacy Framework ranged from 5 to 28 in the Montana and Oklahoma case studies. There was a statistically significant correlation between pre- and posttest score differences and the number of teacher reported instructional connections in Oklahoma. There was also a statistically significant correlation between pre- and posttest scores differences and the number of composite teacher reported instructional connections.

CONCLUSIONS

The conclusions were not to be generalized beyond the case studies within this research. Examination and analysis of the major findings for each objective led to the following conclusions:

1. Students at each site had some knowledge of Food and Fiber Systems prior to the study.
2. In each case study, it was possible to increase student knowledge about agriculture by infusing instruction based upon the Food and Fiber Systems Literacy Framework standards and benchmarks.
3. Teachers at each site struggled with the concept of connecting existing instruction to Food and Fiber Systems standards and benchmarks, although with training and application, that concept became easier.
4. A positive relationship existed between the number of connections teachers made to the Food and Fiber Systems Literacy Framework and increases in student knowledge.

RECOMMENDATIONS

Based upon the conclusions and major findings of the research, the following recommendations were made:

1. As a means of assessing changes in student knowledge about Food and Fiber Systems, existing agricultural literacy instructional materials should be linked to the Food and Fiber Systems literacy standards and benchmarks. Additionally, those standards and benchmarks should be used as a guide for new instructional material development.

2. There is a need for inservice training of teachers at all grade levels to assist them in making relevant connections between core academic instruction and Food and Fiber Systems.
3. Further investigation is needed to better understand how Food and Fiber Systems standards and benchmarks can be effectively infused into departmentalized instruction often found in middle schools and junior and senior high schools.
4. Subsequent studies should incorporate an experimental or quasi-experimental design with larger student populations to better understand the relationship between teaching and learning and the Food and Fiber Systems Literacy Framework.

IMPLICATIONS

The conclusions from this study showed that the Food and Fiber Systems Literacy Framework can be effectively used to guide instruction about agriculture. The opportunity exists for further dialogue about agricultural literacy and the use of standards and benchmarks to assess agricultural literacy levels. Discussions among agricultural literacy professionals, agriculture educators, curriculum specialists, state education leaders, and local educators must focus on agricultural literacy as the common goal. To accomplish that goal, consensus agreement must be reached on the definition and scope of agricultural literacy. The use of the Food and Fiber Systems Literacy Framework with its standards and benchmarks provides an opportunity to engage the stakeholders in a dialogue toward attaining that goal.

The whole-school setting for implementing Food and Fiber Systems literacy instruction works to create a synergy among teachers, administrators, students, and parents. That synergy may lead to greater overall student achievement and increase the chances of sustaining infusion of Food and Fiber Systems standards across academic core disciplines.

ERIC Full Text Provided by ERIC

REFERENCES

Frick, M.J. (1990). A definition and the concepts of agricultural literacy: A national study. Unpublished doctoral dissertation, Iowa State University, Ames.

Herren, R.V. & Oakley, P. (1995). An evaluation of Georgia Agriculture in the Classroom program. Journal of Agricultural Education, 36 (4), 26-31.

Law, D.A. (1990). Implementing agricultural literacy programs. Agricultural Education Magazine, 62 (9), 5-6, 22.

Leising, J.G. & Zilbert, E.E. (1994). Validation of the California agriculture literacy framework. Proceedings of the National Agricultural Education Research Meeting, USA, 21, 112-119.

National Research Council, Board on Agriculture, Committee on Agricultural Education in Secondary Education. (1988) Understanding agriculture: New directions for agricultural education. Washington, D.C.: National Academy Press.

Nunnery, S. (1996). Ag-outside-the-classroom: The citizens'agenda. The Agricultural Education Magazine 68 (3), 12-13,24.

Swortzel, K.A. (1996). Systematic educational efforts teaching about agriculture and the effect on fourth-grade students knowledge of animal agriculture in Ohio. Proceedings of the National Agricultural Education Research Meeting, USA, 23, 163-172

Trexlar, C. (1997). The cheeseburger came from where?: Elementary school student's understanding of how food is affected by biology and climate. Proceedings of the National Agriculture Research Meeting, USA, 24, 23-33.

AN ASSESSMENT OF AGRICULTURAL LITERACY IN K-8 SCHOOLS

A Critique

Kirk A. Swortzel
Auburn University

The subject of agricultural literacy continues to be an important topic in the agricultural education profession. Ever since the National Research Council's Committee in Agricultural Education in Secondary Schools (1988) proposed that every person should become more literate about agriculture, our profession has developed a number of programs in order to help promote the importance of agriculture to students in elementary and middle schools. Systematic instruction must be provided to students if they are every to understand the importance of the agricultural industry.

This study sought to assess students' food and fiber knowledge before and after receiving instruction based upon the Food and Fiber Systems Literacy Framework standards and benchmarks. The purpose and objectives of the study were clearly stated. Case study methodology was used for this research study.

I have some questions regarding some of the methodological procedures used which may have affected the results of this study. Approximately 800 students, representing different backgrounds, were included in the study. However, not all grade levels were represented in each state. In fact, there was no 4th or 5th grade representation from California while the other states had full representation. What factors prohibited the inclusion of these students in the study? I wonder if the lack of data from these students affected the results and conclusions of this study in any way. Secondly, there was a high mortality rate in this study, particularly in California. Test mortality accounted for over half of the students from California not completing the posttest (more so, the mortality rate occurred in grades 6-8). I am curious to know why these students might not have completed the posttest and how the authors might have prevented such a high mortality rate.

I found the results to be interesting and informative. I do wonder about the mortality rates and how that affected the results of the study. Did the authors consider only comparing pretest and posttest scores on students who completed both tests? Did the fact that students did not complete the posttest automatically produce significant results? I would find it interesting the see the comparison of students who only completed both tests to see if any differences occurred.

I commend the authors for conducting this research. It is important to know how effective systematic instruction is improving students' knowledge about agriculture. It would appear that teachers had problems with making connections with existing instructional practices with the standards and benchmarks. I agree with the authors that inservice training must continue so these standards and benchmarks can be effectively infused into the instructional program. I hope that this project continued to be implemented in other states and will do an effective job of making more people literate about agriculture.

ERIC Full Text Provided by ERIC

NAERC '99 Research Fresh from Florida

Comparison of Elementary Teachers' Use of Agriculture in Their Teaching

Anissa Wilhelm
North Dakota State University

Robert Terry, Jr.
Oklahoma State University

William Weeks
Oklahoma State University

INTRODUCTION

A wealth of research has found a lack of understanding and a low perception of agriculture by both students and teachers (Horn & Vining, 1986; National Research Council, 1988; Williams & White, 1991; Terry, Herring, & Larke, 1992; Cox, 1994; Wright, Stewart, & Birkenholz, 1994).

In an effort to evaluate the status of agricultural education, the National Research Council (1988) established the Committee on Agricultural Education in Secondary Schools to conduct a study to address the status of agricultural education. Findings from that report indicated that education about agriculture should take place in all grades, K–12. The report also stated that little effort was being made to provide opportunities for teacher education about agriculture and that teachers were generally unaware of the instructional materials designed to address education about agriculture. The Committee suggested that "in-service education or special summer programs for teachers should be offered focusing on how to use new instructional materials" (p. 17).

Agriculture education at the elementary level is not a new concept (Everett, 1985). Everett cited that in 1914 the role of agricultural education at the elementary level was the awareness and orientation of agriculture. Ferguson and Lewis (1908) identified knowledge of the

ERIC Full Text Provided by ERIC

science of agriculture was desirable. They advocated that "every American should understand the elementary principles of agriculture because it is our country's most important industry" (p. 1). These authors further stated that "school is a place where many of our ideas and ideals are formed" (p. 264). One model program identified by the NRC (1988) as a means to provide education about agriculture at the elementary level was Agriculture in the Classroom (AITC). The USDA began the AITC program in 1981 (Traxler, 1990). AITC programs are present in every state (Moore, 1993).The NRC (1988) reported that the USDA had estimated that teachers using AITC materials have reached approximately 1.2 million elementary students.

Agriculture remains an important industry in our country. In 1985, Mawby noted that "few issues are of greater importance to the world than adequate food supplies, proper food use, and knowledge about the components of the agricultural industry" (p. 7). The Committee stated (NRC, 1988) "Agriculture - broadly defined - is too important a topic to be taught only to the relatively small percentage of students considering careers in agriculture and pursuing vocational agriculture studies" (p. 8). All people are affected by the agriculture industry, socially, economically, and environmentally (Pope, 1990). Law and Pepple (1990) suggested all members of society have a vested interest in agriculture.

Hillison (1992) commented that a key to educating students about agriculture, especially at the elementary grade levels, was through elementary teachers. Yet, these teachers needed assistance in doing so. Birkenholz, Frick, Gardner, and Machtmes (1995) recommended pre-service and in-service opportunities as the vehicle to facilitate the use of agricultural topics and examples in the classroom. This agreed with studies by Terry, Herring, Larke (1992), Cox (1994), and Connors and Elliot (1994) which found that teachers needed assistance through in-service opportunities and material and information.

Several states such as California, Idaho, Montana, Michigan, New Mexico, Oregon, and Oklahoma have provided teacher workshops to familiarize teachers with the use of agriculture to teach core areas (Emery & Linder, 1993, Pals & Waitley, 1996, Lombardi & Malone, 1990, Moore, 1993, Dormody & Shanks, 1992, Balschweid, Thompson, & Cole, 1998, Wilhelm, Cox, & Terry, 1998). In these states, the workshops received positive acclaim by the teachers who attended.

In Oklahoma, AITC instructional materials and teacher institutes are available. Yet, little is known about the effectiveness of efforts to facilitate the teaching about agriculture in Oklahoma. Because of this lack of information, there is a need to examine the effectiveness of Oklahoma AITC program teacher development efforts that are designed to increase the use of agriculture by teachers as a vehicle to teach core areas. The question that needed to be answered was, "What is the value of the Oklahoma AITC summer institute as a means to introduce and increase Oklahoma elementary school teachers' use of agriculture in their teaching?"

PURPOSE AND OBJECTIVES

The purpose of this study was to determine whether the AITC summer institutes have influenced teachers' use of topics related to agriculture in their teaching. To accomplish the purpose of this study, the following objectives were formulated.

1) Describe and determine differences in selected demographic characteristics of teachers who have been introduced to AITC.
2) Describe and determine differences in topics related to agriculture that teachers who have been introduced to AITC are teaching.
3) Describe and determine differences in use of resources related to agriculture by teachers who have been introduced to AITC.
4) Describe and determine differences in the number of lessons taught using topics and/or examples related to agriculture in core area subjects by teachers who have been introduced to AITC.

PROCEDURES

This was an ex post facto study that used static group comparison design. The population for this study was elementary teachers on the Oklahoma AITC newsletter mailing list. Teachers were placed on the newsletter based on one of the following: attendance to past summer institutes, a mini-workshop by the Oklahoma State Department of Education, a one-day workshop led by 4-H personnel/Extension educator, signed up at a trade show or Oklahoma Education Association annual conference booth, found and used the materials in their school, or purchased instructional AITC materials.

Two groups were utilized in this study. One group consisted of the 92 Oklahoma elementary teachers who had attended one of the first three summer institutes offered at Oklahoma State University. These teachers taught in grades ranging from kindergarten to sixth. The second group consisted of a random sample of teachers from the current newsletter mailing list who had not attended a summer institute and taught grades kindergarten through sixth. The current mailing list consisted of 826 Oklahoma teachers. Teachers who had attended a summer institute were removed from the mailing list leaving a list of 734 eligible teachers. From this list, a random sample of 250 teachers, per the recommendation of Krejcie and Morgan (1970), was selected. These groups were selected because both had experience with AITC materials with the exception of attendance to a summer institute.

A mailed questionnaire was used to collect data for this comparison study. The questionnaire was designed by the researcher from research instruments used in similar studies (Terry, Herring, & Larke, 1992, Cox, 1994). The questionnaire consisted of four parts which included demographic information, use of topics and resources related to agriculture, number of lessons using a topic related to agriculture in core area subjects, and teacher development experiences.

To establish content and face validity, faculty and staff of the department of Agricultural Education, Communication, and 4-H Youth Development at Oklahoma State University reviewed the instrument. These reviewers examined the instrument based on appropriateness to measure the objectives. Additionally, a pilot study was used. Seven Oklahoma elementary educators not

included in the sample piloted by the questionnaire. Based on the recommendations of the teachers in the pilot study and those of the faculty and staff at Oklahoma State University, some questions were re-written and/or re-designed for clarity.

Reliability was established from portions of questionnaires used on past similar studies. Part II of the questionnaire, used in the study by Terry, Herring, and Larke (1992), had a Cronbach's alpha reliability of .89. Part III of the questionnaire had a Cronbach's alpha reliability of .73 that was calculated from this study.

A total of three mailing attempts of the questionnaire were made to ensure adequate response. Two weeks after the original mailing, a follow-up post card was mailed to those teachers who had not yet responded. A third reminder was mailed two weeks following the post card reminders. To address non-response, early respondents were compared to late respondents to determine any differences between respondents and non-respondents. Late respondents were those who returned the questionnaire after the due date of the final mailing. For both groups, teachers who had attended a summer institute and those who had not, early and late respondents were compared on demographic information. As no significant differences were found, the sample included both early and late respondents. For this study, the findings are cautiously inferred to the larger population.

ANALYSIS OF DATA

Descriptive statistics were used to evaluate demographic information and group means and frequencies. Chi-square procedure was used to analyze questions that required a categorical response of yes or no in order to look at differences between the two population groups. On questions that asked for a number response, analysis of variance (ANOVA) was used to compare differences between the two population groups. An alpha level of .05 was used in all statistical analysis.

RESULTS

Respondents were divided into two groups based on their Agriculture in the Classroom training experience. Those groups were 1) the 92 Oklahoma elementary teachers who had attended one of the first three AITC summer institutes offered at Oklahoma State University and 2) a random sample of 250 teachers from the current AITC newsletter mailing list who had not attended a summer institute. Throughout the remainder of this study, teachers in the first group were referred to as "institute teachers" and the teachers in the second group were referred to as "non-institute teachers".

Of the 92 institute teachers, 55 questionnaires were returned. From the 55 respondents, three were deemed not useable as those three teachers were no longer teaching an elementary classroom. The response rate of institute teachers was nearly 60%. Of the 250 questionnaires mailed to the random sample of non-institute teachers, 138 questionnaires were returned. Of the 138 questionnaires, 45 were deemed not useable because those respondents were no longer teaching in an elementary classroom. The response rate of non-institute teachers was 55.20%.

Findings Related to Objective One:

Institute teacher respondents were all female and had a mean age of nearly 44 years. They had nearly 15 years teaching experience and most reported their highest degree to be a bachelors degree (64.71%). Grade levels taught ranged from pre-kindergarten to sixth grade. Eighty percent of institute teachers taught in rural communities and small towns. Very few of the respondents, fewer than 4%, had been a member of FFA. Over half, 51.00%, had been a member of 4-H with a mean length of membership of slightly more than 2 years. Few of the respondents had ever taken an agriculture course in either high school and/or college. Of the respondents, 60.00% grew up on farms or ranches or in small towns. Nearly half of the respondents indicated agricultural production or an agricultural business had been the major source of income for them and/or their family. Twenty-one of the respondents (41.18%) also indicated involvement in organizations such as 4-H leader and/or parent, FFA booster organizations, Farm Bureau, and/or farmer's cooperatives.

Non-institute respondents were predominantly female (95.65%) with a mean age of nearly 43 years. They had nearly 16 years teaching experience and had reported a bachelors degree (59.78%) as their highest degree. Grade levels taught ranged from pre-kindergarten to sixth grade. Nearly 40% of non-institute teachers taught in rural communities, followed by small towns (23.91%). Nearly ten percent of the respondents had been a member of FFA. Less than half of the respondents had been a member of 4-H with a mean of just more than 2 years of membership. A limited number of the respondents (18.48%) had ever taken an agriculture course in either high school and/or college. The respondents indicated a variety of types of communities in which they grew up. Nearly 27% of the respondents grew up on farms or ranches, followed by large towns (21.35%) and small towns (19.10%). Nearly 40% of the respondents indicated that agricultural production or an agricultural business had been the major source of income for them and/or their family. Nineteen of the respondents (20.65%) also indicated involvement in organizations such as 4-H leader and/or parent, 4-H Foundation, FFA booster organizations, FFA Alumni, Young Farmers, Farm Bureau, and/or farmer's cooperatives.

In comparing the demographic characteristics of institute and non-institute teachers, significant differences were found in teachers teaching in a small town community, and affiliation with agricultural organizations. More institute teachers taught in small towns and were involved in agricultural organizations than were the non-institute teachers. These data are shown in Table 1 and Table 2.

Table 1: Age, gender, and teaching experience of institute and non-institute teachers

	Institute teachers			**Non-institute teachers**			P(t)
Characteristic	**N**	**M**	**%**	**N**	**M**	**%**	
Years of teaching experience	51	14.76		92	15.60		.5921
Age	51	43.80		87	42.98		.6204
Gender							.1310
Female	51		100.00	88	95.65		
Male	0		0.00	4	4.35		

Table 2: Other demographic characteristics of institute and non-institute teachers

Characteristic	Institute teachers		**Non-institute teachers**		χ^2 p-value
	N	%	N	%	
Member of FFA	2	3.92	9	9.78	.2077
Member of 4-H	26	51.00	43	46.74	.6268
Took agriculture course(s) in high school	3	5.88	11	11.96	.2417
Characteristic	Institute teachers		**Non-institute teachers**		χ^2 p-value
	N	%	N	%	
Took agriculture course(s) in college	3	5.88	6	6.52	.8801
Community in which school is located:					
Rural (<2000)	20	40.00	34	36.96	.8874
Small town (2001 to 15000)	20	40.00	22	23.91	.0448*
Large town (15001 to 45000)	3	6.00	13	14.13	.0924
City (45001 to 75000)	3	6.00	10	10.87	.3365
Large city (>75000)	4	8.00	13	14.13	.2825
Community in which respondent grew up:					
On a farm/ranch	18	36.00	24	26.97	.2469
Rural (<2000)	9	18.00	17	17.10	.6367
Small town (2001 to 15000)	12	24.00	19	21.35	.7185
Large town (15001 to 45000)	4	8.00	14	15.73	.1927
City (45001 to 75000)	3	6.00	9	10.11	.4074
Large city (>75000)	4	8.00	6	6.74	.7829
Level of education					.5621
Bachelors	33	64.71	55	59.78	
Masters	18	35.29	37	40.22	
Doctorate	0	0.00	0	0.00	
Agriculture production/business is a major source of income for respondent and/or family	25	49.02	36	39.14	.2521
Involvement in agricultural organizations	21	41.18	19	20.65	.0088*

*significant at α=.05

Findings Related to Objective Two:

Respondents were asked to indicate from a list of topics related to agriculture those topics that they taught. A majority of institute teachers indicated that 13 of the 14 topics listed were taught. The most commonly taught topic by this group was farm animals (92.16%). Six other topics were taught by over 80% of the respondents. Those topics were plant growth and development (90.20%), nutrition and proper food selection (88.24%), wildlife (84.31%), and gardening (82.35%).

Non-institute teachers were asked to indicate topics related to agriculture taught in their classrooms from the same list of topics as institute teachers. More than half of the non-institute teachers indicated they taught 9 of the 14 topics listed. The five most commonly taught topics were nutrition and proper food selection (83.87%), sources of food (80.65%), plant growth and development (78.50%), wildlife (75.27%), and insects (73.12). Some respondents listed additional topics in the "other" area. These topics were animal growth and development and hatching chicken eggs.

In comparing the use of topics, two of the 14 topics were found to have statistical differences between institute teachers and non-institute teachers. Those topics were farm animals and gardening - floral and/or vegetable. In both cases, institute teachers used each topic significantly more than did the non-institute teachers. These data are summarized in Table 3.

Table 3: Comparison of use of topics related to agriculture between institute and non-institute teachers

Topic	Institute teachers N	Institute teachers %	Non-institute teachers N	Non-institute teachers %	χ^2	χ^2 p-value
Farm animals	47	92.16	61	65.59	12.397	.0004*
Plant growth and development	46	90.20	73	78.50	3.143	.0762
Nutrition & proper food selection	45	88.24	78	83.87	.504	.4779
Insects	44	86.27	68	73.12	3.298	.0693
Sources of food	43	84.31	75	80.65	.30	.5841
Wildlife	43	84.31	70	75.27	1.595	.2066
Gardening (floral and/or vegetable)	42	82.35	53	56.99	9.439	.0021*
Ecology and environmental management	39	76.47	60	64.52	2.191	.1388
Role of agriculture in our economy	33	64.71	52	55.91	1.053	.3049
Agriculture in our history	30	58.82	46	49.46	1.158	.2819
Small animal and pet care	29	56.86	41	44.09	2.152	.1423
Sources of fiber (for clothing, building, etc.)	28	54.90	45	48.39	.559	.4545
Agricultural careers	28	54.90	39	41.94	2.226	.1357
Composition of soils	18	35.29	20	21.51	3.224	.0726

*Significant at α=.05, df=1.

Findings Related to Objective Three:

Institute teachers were asked to indicate sources of teaching materials related to agriculture used in the classroom from a list of 20 sources. Of the 20 sources, 7 sources were used by over half of the respondents (see Table 4). AITC materials were used by 100% of the institute teachers. Other commonly used sources of teaching materials related to agriculture were chapters in text books (66.67%), the Cooperative Extension Service (64.71%), dairy associations or groups (62.75%), United State Department of Agriculture (62.75%), articles about agriculture in newspapers and/or magazines (60.78%), and Project Wild (60.78%).

Table 4: Resources related to agriculture used by institute teachers

Source	N	Percent
Agriculture in the Classroom	51	100.00
Chapters related to agriculture in text books	34	66.67
Cooperative Extension Service	33	64.71

Table 4: Continued

Source	N	Percent
Dairy associations or groups	32	62.75
United States Department of Agriculture	32	62.75
Articles about agriculture in newspaper and/or magazines	31	60.78
Project Wild	31	60.78
4-H school enrichment programs	25	49.02
Environmental associations or groups	22	43.14
Animal associations or groups	20	39.22
Project Learning Tree	19	37.25
Flower and plant associations or groups	16	31.37
Meat associations or groups	12	23.53
Materials from local high school agriculture program	8	15.69
Seed and grain associations or groups	8	15.69
National FFA Organization	7	13.73
Farm Bureau	5	9.80
Food for America	5	9.80
Vegetable associations or groups	5	9.80
Fruit associations or groups	3	5.88

Non-institute teachers were asked to indicate sources of teaching materials related to agriculture used in their teaching from the same list of 20 sources. Of the 20 listed, 5 were used by more than half of the respondents (see Table 5). AITC materials were used by slightly more than 80% of the non-institute teachers. Other common sources of teaching materials related to agriculture were chapters in text books (64.52%), Project Wild (62.37%), articles about agriculture in newspaper and/or magazines (50.54%), and the Cooperative Extension Service (50.54%).

Table 5: Resources related to agriculture used by non-institute teachers

Source	N	Percent
Agriculture in the Classroom	77	82.80
Chapters related to agriculture in text books	60	64.52
Project Wild	58	62.37
Articles about agriculture in newspaper and/or magazines	47	50.54
Cooperative Extension Service	47	50.54
Dairy associations or groups	43	46.24
Environmental associations or groups	39	41.94
United States Department of Agriculture	39	41.94
Animal associations or groups	32	34.41
4-H school enrichment programs	25	26.88
Flower and plant associations or groups	24	25.81
Project Learning Tree	23	24.73
Materials from local high school agriculture program	18	19.36
Meat associations or groups	13	13.98
Seed and grain associations or groups	13	13.98
Fruit associations or groups	10	10.75
Food for America	9	9.78
Farm Bureau	8	8.60
Vegetable associations or groups	8	8.60
National FFA Organization	7	7.53

In comparing the two groups of teachers, significant differences were found in use of 4-H school enrichment programs, AITC materials, and USDA materials. Institute teachers used these three sources significantly more than did the non-institute teachers. A report of these findings from all sources is in Table 6.

Table 6: Comparison of use of resources related to agriculture between institute and non-institute teachers

Source	df	χ^2	χ^2 p-value
Agriculture in the Classroom	1	9.871	.0017*
4-H school enrichment programs	1	7.122	.0076*
United States Department of Agriculture	1	5.437	.0197*
Dairy associations or groups	1	3.597	.0579
Cooperative Extension Service	1	2.678	.1018
Project Learning Tree	1	2.501	.1138
Meat associations or groups	1	2.094	.1479
National FFA Organization	1	1.442	.2298
Articles about agriculture in newspaper and/or magazines	1	1.393	.2379
Fruit associations or groups	1	.9510	.3294
Flower and plant associations or groups	1	.5090	.4757
Animal associations or groups	1	.3300	.5657
Materials from local high school agriculture program	1	.3000	.5841
Seed and grain associations or groups	1	.0770	.7812
Chapters related to agriculture in text books	1	.0670	.7954
Vegetable associations or groups	1	.0580	.8098
Farm Bureau	1	.0580	.8098
Project Wild	1	.0350	.8518
Environmental associations or groups	1	.0190	.8890
Food for America	1	.0010	.9967

*Significant at α=.05

Findings Related to Objective Four:

Core area subjects were outlined in the Oklahoma Priority Academic Student Skills (PASS) manual prepared by the Oklahoma Department of Education (revised 1997). Institute teachers indicated that science was the core area in which the most topics and/or examples related to agriculture were used followed by math, language arts, social studies, information skills, and visual arts, respectively. Non-institute teachers reported that the most lessons they taught using a topic and/or example related to agriculture was in the core area of math followed by science, social studies, language arts, visual arts, and information skills, respectively.

Analysis of variance showed significant differences in two of the six core areas. Those two core areas were language arts (p=.0350) and information skills (p=.0407). In both cases, institute teachers taught more lessons using an agricultural topic and/or examples in those core areas. Table 7 summarizes these data.

Table 7: Number of lessons using an agricultural topic and/or example in core area subjects by institute and non-institute teachers

	Institute Teachers	Non-institute Teachers	
	Mean # of lessons	Mean # of lessons	ANOVA p-value
Core Area			
Science	81.85	63.94	.3479
Math	76.42	70.35	.8487
Language Arts	64.98	24.33	.0350*
Social Studies	36.21	26.16	.3018
Information Skills	24.40	8.57	.0407*
Visual Arts	22.56	10.39	.1673

*significant at α=.05

CONCLUSIONS AND/OR RECOMMENDATIONS

Based on the findings of this study the following conclusions were made:

1. Demographic characteristics of institute and non-institute teachers were quite similar.
2. Teachers who attended the summer institute tend to have a vested interest in agriculture. Nationally, 20% of people are involved in the agriculture industry (Glickman, 1996). Based on the findings of this study, nearly 40% of non-institute teachers and nearly 50% of institute teachers indicated that agriculture was a major source of income.
3. Teachers who have attended an Oklahoma AITC summer institute teach more topics related to agriculture than do their counterparts who have not attended an AITC summer institute.
4. Teachers who have attended an Oklahoma AITC summer institute use a greater variety of resources to teach about agriculture than do their counterparts who have not attended an AITC summer institute.
5. Based on teachers' responses, AITC materials are popular resources used by both institute and non-institute teachers although used significantly more by institute teachers.
6. Institute teachers tend to use topics related to agriculture in teaching the core areas of language arts and information skills than do their counterparts who have not attended an AITC summer institute.
7. The Oklahoma summer institute is beneficial in helping teachers use concepts related to agriculture in their teaching.

The following recommendations were made based on the findings of this study and the conclusions that were reached:

1. It is recommended that Oklahoma AITC coordinators increase efforts to attract a diverse group of teachers to the summer institute, specifically, more male teachers, more teachers who teach in urban areas, and more teachers without a vested interest in agriculture.
2. Institute teachers use more topics and resources related to agriculture to teach core areas subjects. Therefore, it is recommended that summer institutes continue to be conducted in order to introduce more teachers to the use of agriculture as a vehicle to teach core area subjects.
3. Since only 40 teachers per year are able to receive the intensive summer institute experience, it is recommended that additional methods of intensive teacher development should be provided to reach a greater number of teachers.
4. Longitudinal research should be conducted on teachers who have taken part in institutes to determine how they are using concepts related to agriculture in their teaching.
5. Research should be conducted on students of institute participants to assess their awareness and perceptions about agriculture.
6. A study similar to this should be conducted to compare teachers who have been introduced to Oklahoma AITC to those who have not.
7. The focus of the Oklahoma AITC has been on professional development of experienced teachers. As recommended by other researchers (Humphrey, Stewart, & Linhardt, 1994), pre-service opportunities should be provided to prepare future teachers with necessary skills to use agriculture as a vehicle to teach core subjects and alleviate the barrier of lack of confidence in the use of agriculture.

ERIC Full Text Provided by ERIC

REFERENCES

Balschweid, M. A., Thompson, G. W., & Cole, R. L. (1998). The effects of an agricultural literacy treatment on participating K-12 teachers and their curricula. Proceedings of the 24th National Agricultural Education Research Meeting, Las Vegas, NV.

Birkenholz, R., Frick, M., Gardner, H., & Machtmes, K. (1995). Rural and urban inner-city school student knowledge and perception of agriculture. Journal of Agricultural Education, 36, (4), 1 – 9.

Connors, J. J., & Elliot, J. (1994). Teacher perceptions of agriscience and natural resources curriculum. Journal of Agricultural Education, 35, (4), 15 - 19.

Cox, C. B. (1994). An assessment of the knowledge and perceptions of agriculture by selected fourth grade teachers in Oklahoma. Unpublished doctoral dissertation, Oklahoma State University.

Dormody, T. & Shanks, M. (1992). Ag in the Classroom begins with educating teachers. The Agricultural Education Magazine, 64, (11), 16-18.

Emery, P. M. & Linder, M. P. (1993). Integrating agriculture into the science curriculum. The Agricultural Education Magazine, 65, (7), 17 – 18.

Everett, S. F. (1985). The prologue to vocational agriculture. The Agricultural Education Magazine, 58, (4), 5 – 8.

Ferguson, A. M. & Lewis, L. L. (1908). Elementary principles of agriculture. Chicago, IL: Ferguson Publishing Company.

Hillison, J. (1992). Reaching and teaching elementary teachers about agriculture. The Agricultural Education Magazine, 64, (11) 12 – 13.

Horn, J. & Vining, B. (1986). An assessment of student's knowledge of agriculture. Manhatten, KS: Center of Extended Services and Studies, College of Education, Kansas State University.

Krejcie, R. V. & Morgan, D. W. (1970) Determining sample size for research activities. Educational and Psychological Measurement, 30, 607 – 610.

Law, D. A. (1990). Implementing agricultural literacy programs. The Agricultural Education Magazine, 62, (9), 5 6, 22.

Lombardi, L. & Malone B. J. (1990). Agricultural literacy in Montana schools – "Education about agriculture." The Agricultural Education Magazine, 62, (9), 9 – 10.

Mawby, R. (1985). Forward to Cultivating agricultural literacy: challenge for liberal arts. Edited by Gordon K. Douglas. Battle Creek, MI: W. K. Kellogg Foundation.

ERIC Full Text Provided by ERIC

Moore, E. A. (1993). Agricultural literacy in Michigan: A success story. The Agricultural Education Magazine, 65, (12), 10 - 12.

National Research Council. (1988). Understanding agriculture - New directions for education. Committee on Agricultural Education in Secondary Schools, Board of Agriculture. Washington, D. C.: National Academy Press.

Pals, D. B. & Waitley, R. (198696). Idaho Agriculture in the Classroom teaching elementary teachers and students about agriculture. The Agricultural Education Magazine, 68, (9), 6 - 7, 9,16,22-23.

Pope, J. (1990). Agricultural literacy: A basic American need. The Agricultural Education Magazine, 62, (9), 8, 23.

Terry Jr., R., Herring, D. R., & Larke Jr., A. (1992). Assistance needed for elementary teachers in Texas to implement programs of agricultural literacy. Journal of Agricultural Education, 33, (2), 51 – 60.

Traxler, S. (1990). Why "Ag in the Classroom". The Agricultural Education Magazine, 62, (8), 9 – 10.

Wilhelm, A., Cox, C., & Terry Jr., R. (1998). Assessment of an Ag in the Classroom summer institute. Proceedings of the 48th Annual Southern Region Agricultural Education Research Meeting, Little Rock, AR.

Williams, G. & White, J. (1991). Agricultural literacy in agriculture's heartland. The Agricultural Education Magazine, 63, (8), 9 – 10.

Wright, D., Stewart, B. R., & Birkenholz, R. J. (1994). Agricultural awareness of eleventh grade students in rural schools. Journal of Agricultural Education, 35, (4), 55 – 60.

ERIC

COMPARISON OF ELEMENTARY TEACHERS' USE OF AGRICULTURE IN THEIR TEACHING

A Critique

Kirk A. Swortzel
Auburn University

This study also sought to address the topic of agricultural literacy. While the previous paper sought to primarily assess the knowledge of students regarding agriculture, this study sought to look how elementary teachers have been influenced by professional development activities to incorporate agricultural topics into their teaching. We cannot take for granted that elementary teachers will pick up the information on their own; we, in agricultural education, must step forward and work with teachers to help them see the connection between agriculture and their curriculum.

The problem of this study and the objectives were clearly stated. An expost facto static group comparison design was used in the study to compare teachers who had participated in an institute with those who just received information from the mailing list.

The authors used questionnaires from previous studies to develop their questionnaire for this study. I noticed that when the reliability coefficients were reported for this study, the coefficient for Part II was from a questionnaire in a previous study and the coefficient from Part III was reported from this study. Was a reliability coefficient calculated on Part II of this study? If so, how did it compare to the coefficient as reported by Terry, Herring and Larke (1992)? Was any type of reliability assessment conducted on Part IV of the questionnaire for this study?

I found the results of the study to be interesting. In reading the conclusions, I have some comments about conclusion # 3 that might help with the interpretation of the results of the study. Conclusion #3 was "Teachers who have attended an Oklahoma AITC summer institute teach more topics related to agriculture than do their counterparts who have attended an AITC summer institute." Did not both groups teach the same number of topics? Rather was it really the number of teachers who used particular topics to make agricultural connections that was different? In fact, can we not say (based on the Chi square analysis), that teachers who attended the summer institute taught more about farm animals and gardening than did teachers who did not attend the summer institute?

I am also confused about the results presented in Table 7. The paragraph describing Table 7 reports one thing while the data in Table 7 reports different data for the non-institute teachers. I encourage the authors to take a look at this in order to help clarify and validate the conclusions of this study.

In closing, I encourage the authors to continue their study in this area. Such institutes are valuable to providing elementary teachers with the knowledge and skills needed to effectively integrate agriculture into the curriculum. I hope the Oklahoma AITC institute continues to be successful.

ERIC

Developing a Process for an Elementary and Middle School Agriculturally-Based Curriculum: A Case of Teacher Struggle at Countryside Charter School

Hiro Hikawa
Michigan State University

Cary Trexler
Iowa State University

INTRODUCTION

Charter schools are public schools that collaborate with parents, teachers, school administrators, and others to create alternatives within the existing public school system. Charter schools are free and open to all, and designed to be publicly accountable, creative, and flexible (National Institute on Student Achievement, Curriculum, and Assessment, 1998). In the 1997, there were approximately 700 charter schools throughout the US.

Michigan, in 1993, was one of the first states to pass charter school legislation. After an initial battle in its Supreme Court, Michigan legislators passed the Michigan New Charter School Law (1994). This law's intent was for charter schools to:

(1) improve pupil achievement by improving the learning environment,
(2) stimulate innovative teaching methods,
(3) create new professional opportunities for teachers in a new type of public school in which the school structure and educational program can be innovatively managed by teachers at the school site level,
(4) achieve school accountability for educational outcomes by placing full responsibility for performance at the school districts, and
(5) provide parents and pupils with greater choices (p. 1).

In 1994, as a result of this legislation, six farmers in rural Berrien County met to discuss educational options and concluded that students needed to learn in non-conventional ways. As a result, they decided to create a charter school. In August 1997, Countryside Charter School (CCS) opened to serve about 200 K-8th grade students. The school set forth a unique vision and was built on an idyllic site. The unique vision of the CCS's teaching approach included: (a) the integration of agricultural and environmental themes into the curricula, and (b) the use of a 75 acre land laboratory for experiential learning through Food, Agriculture, Renewable Resources and Environment (FARE) themes. This ideal setting features two ponds, a stream, cropland, woodlot, and grassland. Located amidst commercial orchards and cropland in one of the nation's most diversified agricultural areas, the site provides a fertile environment for learning.

In the summer of 1997, four weeks before the school was to open, newly hired teachers were asked to develop an eight-week thematic unit of study for the three grade level grouping: early elementary, upper elementary, and middle school. The curriculum was to include the following three components: (a) integration of the FARE themes, (b) Michigan Department of Education (MDE) Standards and Benchmarks (1996), and (c) utilization of the 75 acres of land. However, right after the school began, a lack of time for curriculum development was identified as a primary constraint. A university consultant[1] who helped design the school noted: "with just four weeks of planning prior to the start of school, teachers quickly became overwhelmed with the day-to-day preparation of lessons. The time needed for the development of new curricula and thematic units was missing, and consequently, teachers confronted difficulties in curriculum development with the three components of the FARE theme-based curriculum" (Trexler, 1998).

To remedy the situation, a proposal was submitted for a US Department of Education (USDE) Charter School Grant. The proposal sought additional time during the summer of 1998 to develop curriculum; the grant was awarded in April 1998. Additionally, grant funds were used to hire an educational consultant to help teachers with the curriculum development and utilization of the 75-acre land laboratory for teaching and learning.

ERIC Full Text Provided by ERIC

THEORETICAL FRAMEWORK

Many studies identified the importance of teaching agricultural topics at various grade levels. The National Research Council (1988) coined the term "agricultural literacy" and suggested that agriculture was too important to be taught only in vocational education. Agricultural educators argue that agricultural concepts should be taught through the integration of such concepts into other curricular areas (NRC, 1988; Trexler and Miller, 1992; Leising & Zilbert, 1994; Birkenholz et al., 1994; Frick, Birkenholz, & Machtmes, 1995).

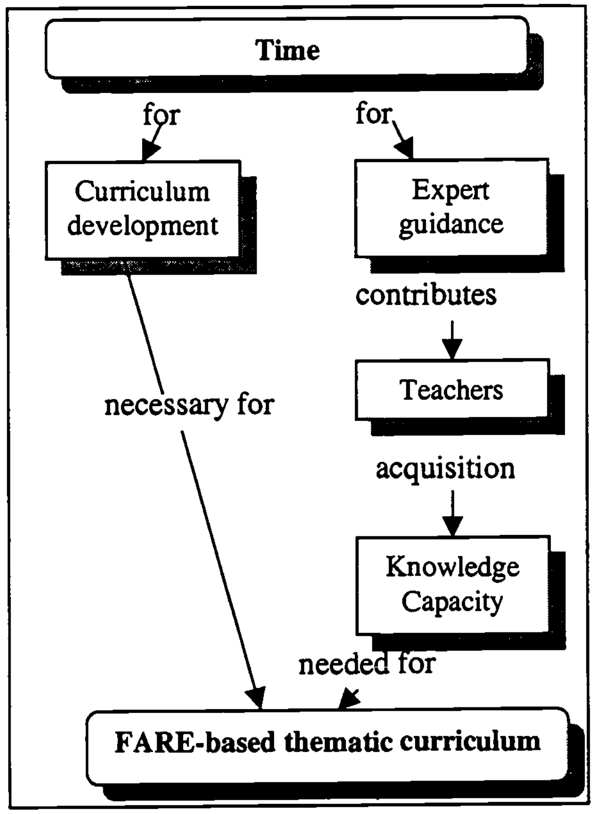
To integrate agricultural concepts into school curricula, Frick et al. (1994) suggest that teachers require assistance through pre- and in-service programs. Other educators argue assistance would come in the form of developing teachers' agricultural knowledge and capacity to teach this content (Humphrey, Stewart, & Linhardt, 1994; Terry, Herring, & Larke, 1994). Hashew (1986) made a salient finding as high school teachers' knowledge of biology [agriculture in this case] contributed to the transformation of a science curriculum into classroom instruction. Agricultural educators, Rudd and Hillison (1995), found that the middle school teachers' agricultural knowledge influences the inclusion of agricultural topics into the classroom curriculum. Concomitant to developing teachers' understanding of agricultural concepts, assistance should be provided to develop teachers' instructional skills (Trexler & Suvedi, 1998). Drake (1990) suggests that the success of infusing agricultural concepts into the curricula depends on the instructional ability and skills of teachers. Therefore, the integration of agricultural concepts into any level of the school curricula necessitates helping teachers develop both agricultural knowledge and instructional capacity.

Teachers also need time and skills to integrate agricultural concepts into the curricula (Trexler & Suvedi, 1998). Jacobs (1989) suggests "time is currency of education; what teachers can d do is limited by the time they have to plan" (p. 9). Time is required for teachers to develop agricultural knowledge and instructional capacity; it is necessary to integrate concepts into curricula.

CONCEPTUAL FRAMEWORK

The theoretical framework was operationalized through the USDE funded grant. Figure 1 outlines the conceptual framework that guides the study and shows that the resources of time and expert guidance affect teachers' ability to infuse FARE themes into elementary and middle school curriculum. Both resources are seen as essential to help teachers develop knowledge and understandings of concepts as well as their capacity to design and implement a thematic curriculum based on the study of food, agriculture, renewable resources and the environment.

Figure 1: Conceptual framework for curriculum development



PURPOSE / GUIDING QUESTIONS

Based on this conceptual framework, this qualitative case study's purpose was to document teachers' progress in developing a FARE-based curriculum and describe how the use of the USDE Grant funds provided resources that affected teachers' progress toward this aim. Following questions guided the study:

1. What were the teachers' teaching backgrounds prior to teaching at CCS?
2. How did the curriculum development process in 1997 compare 1998?
3. What practices were helpful or unhelpful for the curriculum development process?
4. How were the FARE themes integrated into the curriculum?
5. What did teachers need so that they could improve future curriculum development?

METHODOLOGY

Population

The population of this study was the six teachers, representing all staff involved in the process of curriculum development. All had taught in the charter school since its inception and were involved in curriculum development during the summers of 1997 and 1998. These teachers taught at different multi-aged grade levels: one kindergarten, two 1-2 grade, one 3-4 grade, one 5-6 grade, and one 6-9 grade.

Data Collection

Personal interviews were conducted with the six teachers in the classrooms without students present. The interviews were designed to elicit information to answer the study's five questions. Responses to questions were audio taped and transcribed, serving as the primary data. In addition, other informal interviews were conducted with the university consultant for the school, the agriscience program coordinator[2], the curriculum coordinator[3], and other school staff to elicit supplementary information regarding teachers' performance on curriculum development.

Analysis of Data

Discourse analysis (Tannen, 1989) was used to interpret meaning of participants as they talked about their ideas of and impressions to the study's guiding questions. Analysis followed a four-phase process. First, raw data from interview tapes were listened to, and then salient parts of each interview were transcribed for further analysis. In the second phase, strips of conversation from the raw data were coded to allow for reassembly into the essence of shared meaning (Strauss, 1987) and placed into "bins" for organization (Miles and Huberman, 1984). In phase three of analysis, confirming and disconfirming evidence of patterns among groups and individuals was sought. In the final phase of data analysis, findings and conclusions were validated. Informants were asked to comment on a final draft of the study. Teachers provided both oral and written suggestions to clarify and pinpoint the study's assertions; these were integrated into the final version of this study.

FINDINGS / DISCUSSION

Question 1: What were the teachers' backgrounds prior to teaching at CCS?

Overall, previous teaching experiences of the informants were relatively short. Teachers' backgrounds and previous teaching experiences are described in Table 1.

Table 1: Previous teaching background and experiences

Mary – K teacher (White female)	• Taught as a substitute teacher and preschool for one year • Taught writing and reading in a community school • Experienced teaching outdoors and developing curriculum
Linda – 1^{st} – 2^{nd} grade teacher (White female)	• Taught preschool and 6^{th} grade math and science for one year • Experienced teaching outdoors with hands-on materials
Diane – 1^{st} – 2^{nd} grade teacher (White female)	• Taught as a substitute teacher for one semester and preschool for one year • Taught art at summer day camps for two summers and developed curriculum • Experienced teaching art in an outdoor setting
Sandy – 3^{rd} – 4^{th} grades teacher (White female)	• Taught in a public school for seven years • Taught environmental topics and outdoors • Experienced National Standards and Benchmarks for science • Experienced developing curriculum (two-week thematic units)
Jennifer – 5^{th} – 6^{th} grade teacher (White female)	• Taught in 4^{th} grade for two years
Lorry – 6^{th} – 9^{th} grade teacher (White female)	• Tutored math for six years • Taught as a substitute teacher for three years

The majority of teachers' formal teaching experience was approximately one year, except for Sandy. She had a total of seven years of teaching experience. In addition, only Sandy had experience with teaching environmental topics, while four teachers had taught in outdoor settings previously. Two of the four obtained these experiences in special school settings, such as before and after school programs and summer day camps.

A focus of this study was to investigate if teachers had used MDE Standards and Benchmarks previously. All teachers indicated that they had no experience with MDE Standards and Benchmarks. Sandy had used National Standards and Benchmarks for science to develop experimental activities previously. As for teachers' experiences with curriculum development, three teachers had developed curriculum in some way. Mary had developed reading and writing kits, while Diane had created curriculum for a summer day camp. Sandy also developed two two-week thematic units for first grade in her previous school. On the other hand, the remaining three teachers had no experience with curriculum development. Jennifer's statement represented teaching in regular school settings:

> [In the previous school] the curriculum was already in place and we had to teach from that. They didn't stress the benchmarks and standards very much. Then, I came here and we were expected to know how to start from scratch.

Summary / Discussion

Overall teaching experiences were relatively short, except for Sandy. Generally speaking, teachers were new to the profession, in fact, for the majority, their work at CCS was their first permanent teaching position. Two teachers were somewhat experienced with curriculum development. However, no teachers had experience with integrating agricultural and

environmental topics into their classes. Teachers' limited teaching experiences might have hindered attainment of the school's expectation about curriculum development.

Question 2: How did the curriculum development in 1997 compare 1998?

Curriculum Development in 1997

Informants were asked to explain how they developed the curriculum in 1997. The university consultant explained about the context of the school. He indicated that in the summer 1997, four weeks prior to the school's opening, teachers began developing a curriculum for the first eight-week unit. When the school was about to open, the entire facility was not ready to start functioning as a school. The building had not been completed, so teachers could not get inside their classrooms until one week before the opening. Even after the building was completed, many essentials were still missing, such as, desks, chairs, books, and so forth. As a result, the school postponed the opening for two days. As the school began, time was taken up by organizing and establishing the school structures.

Teachers indicated that they barely managed to develop the first eight-week unit and they had little time to develop a curriculum for the rest of the year. Three teachers indicated that, for the rest of the year, it was a day-by-day process to teach without organized curriculum and plans. Diane recalled the year:

> I don't know anyone who developed the next nine weeks. I didn't develop. I was barely planning the night before the next day. It was very, very, overwhelming.

Mary and Sandy developed their curriculum with their own knowledge and information. Mary started development by selecting topics from her experiences with pre kindergarten-aged children and from books that spelled out basic and appropriate topics for specific ages. Then, in accordance with these topics, she created the units and activities. Sandy utilized a nine-step plan for writing thematic units based on MDE Standards and Benchmarks. She acquired this planning model from a Berrien County Intermediate School District workshop which include a nine-step template to develop thematic units.

Curriculum Development in 1998

Informants were also asked how they developed the curriculum, during the summer of 1998. Teachers were provided 20 paid-days for curriculum development during that summer. They had series of four meetings with all teachers and other school staff members led by the university consultant. In these meetings, they: (1) selected agriculturally-based themes to frame the curriculum, (2) chose objectives for the themes, and (3) divided the objectives by grade levels within the entire group. Then, teachers worked individually and in groups of the same grade levels to develop actual units of instruction.

During the summer, Mary, Linda, and Diane worked collaboratively. They, first, worked individually and then met in a group to discuss their ideas. They developed a procedure to develop lessons that included: (1) listing all the MDE Standards and Benchmarks and appropriate themes, (2) identifying for resources at teachers' stores and through the Internet and, (3) designing teaching activities. In addition, Sandy and Jennifer also supported each other through collaboration.

Lorry was the only one who did not have other teachers to work with. She stated that she found it difficult to develop a curriculum without guidelines, frequent support from other teachers, and time. She also indicated that teachers at higher grades were required to do more work than teachers at lower grades. She mentioned:

> I know what topics should be in there but there is not enough time to find all the resources and activities for upper grades. Lower grades have all kinds of stuff out there . . . In the case of the upper grades, you can't just jump on the Internet and find as much as you can for K-6.

Summary / Discussion

Teachers felt that not enough time was allocated to curriculum development when the school began. In addition, few organizational structures were in place in 1997. This lack of organization required an enormous amount of time to overcome; time that may have been dedicated to curriculum development. Teachers who had the most experience fared best in developing an organized curriculum. In the summer of 1998--with an organizational structure in place--grant funds provided resources and a process to ameliorate the lack of organized FARE-based curriculum. As a result, teachers worked collaboratively and discussed ideas with others. This collaborative work improved the process of curriculum development to the large extent from 1997 to 1998.

Question 3: What practices were helpful or unhelpful for the curriculum development process?

Helpful

Informants were asked to describe things helpful to the curriculum development process. None identified anything helpful in 19917. However, half of the teachers mentioned that the 20 days in the summer of 1998 helped them develop the first eight-week unit. Diane, particularly, referred to the series of four meetings during the summer as facilitating the exchange of ideas with other teachers.

Five teachers remarked that collaborative work was very helpful. Three of them also mentioned that support from the agriscience program coordinator and the university consultant were helpful. Additionally, both Diane and Jennifer indicated that creating a framework for curriculum development in 1998 made an enormous difference. Diane stated that:

> This year [1998], we have a skeleton. That's what I feel. We have all the bones in place. And I just need to put in the muscles and the tissues and make it run.

ERIC

Unhelpful

As discussed, time constraints were the most commonly mentioned hindrance throughout the interviews. After the 20 days of summer planning, teachers were asked to develop three additional eight-week units for the rest of the year. These additional units were to be developed with three and one-half release days allotted for each. Hence, although the time constraint was lessened, once school began teachers again felt overburdened. This, they said, was exacerbated by their having the day-to-day responsibility of teaching. Mary and Diane stated that they had been spending a tremendous amount of time out-of-school on curriculum development. Diane remarked:

> I did not want to work without being paid and so I did enough to get it done. . . I think it could have been done better. There could have been more extensions, more connections. I may have had more time to look into field trips... Three and half days to develop eight weeks. It's just crazy... Still we are doing a lot of work out of school not being paid for it.

Half of the teachers stated school administrative support was insufficient. Some teachers empathized that the curriculum coordinator was given additional administrative duties and, as a result, did not have time to work with them on curriculum development. Mary also mentioned that she had no support to select objectives in 1998, which hindered lesson planning, while Diane remarked that in 1997, if she had had at least an example of an actual curriculum or of a procedure for its development, it would have been easier for her.

Summary / Discussion

The demands of designing a FARE-based curriculum from scratch were overwhelming. Teachers felt that there were few structures in place to support them in their assigned duties. They found limited support from the school administration and a lack of a process for curriculum development. It is noteworthy that Mary, with previous experience with curriculum development, and Lorry, without this experience, both indicated the absence of in-service training was a problem.

In 1998 the USDE grant provided teachers with sufficient time to create the first eight-week units and develop some type of framework for curriculum development. It also encouraged collaborative work among teachers, because teachers arranged their schedules to work together. Similarly, the series of meetings provided a shared vision for and a process to develop curriculum.

Question 4: How were the FARE themes integrated into the curriculum?

Teachers were asked how they integrated the FARE themes into curriculum. Each told a different story of how they integrated FARE themes.

Mary created the unit and its main theme first and then found some parts of the unit that could be combined with the FARE themes. She said most content at the kindergarten level did not deal with the FARE themes. For example, she developed a project on corn to teach the importance of plants. This project taught about producers and consumers and about the origin of this staple crop. Additionally, it focused on corn growth requirements, consumers' concerns, and traced corn's path to consumption.

Another example of FARE-theme integration is provided by Sandy. She integrated the FARE themes into curriculum through a series of activities. The main topic for the fall 1998 was economics. Her project for this unit was focused on production of a molasses product. Two classes of 3rd and 4th grades took a field trip where students helped harvest sorghum and observed the processing of the sorghum to make molasses. They used the molasses to make cookies and popcorn balls later sold in her classroom. The students planned the amounts needed of all ingredients, shopped for ingredients, measured and mixed ingredients to make products, advertised, estimated the cost per batch, per cookie, decided on price per item, collected money, made change, and had to decide on ways to spend the profits after repaying a loan.

Some teachers, actually the majority, found FARE-theme integration more difficult. Diane mentioned that integration of the FARE themes was very arduous. She believed that her limited knowledge about outdoor activities and FARE themes contributed to her difficulties.

Summary / Discussion

The teachers lacked a standardized procedure for integrating FARE themes into curriculum. In addition, lack of experience and a resulting lack of confidence with the integration of the FARE themes might have affected the process negatively. The teachers that had previous experiences with curriculum development and teaching in outdoor settings indicated they had success at using FARE themes to frame instruction.

It is noteworthy that even though the agriscience program coordinator was developing the land laboratory, most teachers did not allude to its utilization. This might be due to their unfamiliarity with the FARE themes and outdoor education, their limited teaching experiences, and the time constraint On the other hand, some teachers expressed willingness to utilize the land laboratory and to obtain assistance from the agriscience program coordinator.

Question 5 What did teachers need so that they could improve future curriculum development?

The last question addressed teachers' needs for future curriculum development. All teachers indicated that time was the primary need. Sandy stated:

> It's not that we do not want to work at nights or on weekends, but we already do, you know, getting in the classroom and planning what we have with the curriculum. But you still have to plan weekly after you have planned.

Most teachers indicated the need for more support from the curriculum coordinator. More specifically, Mary stated that she needed more support with identifying objectives and developing curriculum scope and sequence, while Lorry needed help with searching for resources and preparing activities.

In service education was also a concern for teachers. Mary and Lorry pointed out that this was a problem. Mary remarked:

> That was a big expectation of our job and we have never been trained for it. It's just kind of thrown into there and do it... and they do provide days for us but the support is not there. Like education is not there.

Lorry echoed the need for in-service training. She lamented:

> I am a teacher, [I'm] not trained to develop a curriculum. So, we are a nervous about it. We have no experiences doing it."

Materials and resources for curriculum planning were also mentioned as needs. Lorry suggested that if the school had an educational library with these materials, it could help teachers with curriculum development. In addition, she suggested allowing teachers to spend some time for curriculum development in a neighboring library. She commented:

> Not having an educational library here makes it very difficult. If I can spend a curriculum day at Western [Western Michigan University], at libraries looking up different resources, instead of having it to be here in school, it would be a big help.

Summary / Discussion

Overall, the most urgent need for the curriculum development was more time. Some teachers also needed materials and resources for curriculum development and more support from the curriculum coordinator. In addition, teachers stated they needed training on best practices for curriculum development. However, it is interesting to note that no teachers alluded to the need for integration of the FARE themes or utilization of the land laboratory. It may be that teachers--overwhelmed as they felt--did not have enough time to pay sufficient attention to the FARE theme integration and utilization of the land laboratory.

CONCLUSIONS / RECOMMENDATIONS / IMPLICATIONS

It should be acknowledged that this study's conclusions pertain to a school-specific context and, because they were derived from a qualitative study, reflect the views of a limited number of informants. The study brings forth, what Erickson (1986) terms "concrete universal," in this case Countryside Charter School's teachers feelings, frustrations, and experiences. These conclusions differ epistemologically from those posited from quantitative studies because they are not meant to be abstract universals built by generalizing from a sample to a population. Rather, a specific case was described in detail to shed light on concrete perspectives. Others interested in the topic then may take these contextualized findings and compare them to other contexts, thereby determining their universality. Similarly, recommendations and implications--specific to this case--may be of import to others interested in elementary and middle school agricultural education in comparable, but slightly different contexts.

CONCLUSIONS

In 1997, teachers did not have sufficient training and experiences needed to fulfill the expected tasks at CCS, the development of the FARE-based curriculum. In addition the lack of training and experiences, organizational structure, time, materials, and the delay of completing the school facilities hampered teachers' curriculum development efforts.

In comparison with 1997, the summer of 1998 activities--brought by the USDE grant--made a significant positive difference in developing a curriculum framework and an eight-week unit. The grant's resources helped teachers develop a process for curriculum development and provided time for it. In spite of the tremendous progress in curriculum development, there were several drawbacks identified. First, teachers lacked sufficient knowledge of and skills for curriculum development. Secondly, the time constraint hindered teachers' curriculum development efforts. Three days and a half to develop a nine-week unit was not sufficient. Another barrier for teachers' curriculum development was a lack of materials, resources, and literature. Teachers believed they wasted time searching resources in bookstores, teacher's stores or in libraries for these resources. Finally, teachers perceived a lack of support from the curriculum coordinator. They felt the coordinator was consumed by administrative tasks and, therefore, did not spend time on curriculum development.

Additionally, missing from the school's curriculum development process were: (a) a standardized procedure to integrate the FARE themes, although the agriscience program coordinator was making some headway in this regard, and (b) a plan for utilization of the land laboratory resources into the curriculum.

RECOMMENDATIONS

Based upon the conclusions above, the following recommendations are offered to CCS to realize its vision for teaching and learning through a FARE-based curriculum:

1. Expand the three and a half days for curriculum development for each unit and provide additional time for curriculum development within the school day.
2. Provide in-service training to enhance teachers' skills for curriculum development.

3. Promote collaborative work among teachers.
4. Implement a standardized procedure to integrate the FARE themes into curriculum and to utilize the land laboratory.
5. Reevaluate the curriculum coordinator's priorities toward curriculum development so that more time is provided with teachers.
6. Provide materials and resources for curriculum development within the school and develop a professional library.

IMPLICATIONS

Implications from this study may be cautiously drawn to other situations. This single case may be emblematic of other charter schools that are planned with agriculturally-based themes. As a result, implications may be logically inferred to at least four groups: (1) boards of education, (2) school administrators, (3) educational policy makers, and (4) university professors.

To clear many of the hurdles similar to those encountered in this case, boards of education and school administrators planning charter schools may profit greatly if--prior to opening a charter school--time and resources are provided to build teacher capacity to develop curriculum. Additionally, time--solely for curriculum develop activities and networking,--during regular school hours would provide for ongoing development and refinement of curricula.

Along the same line, educational policy makers advocating charter schools as a means to strengthen public education may consider channeling funds for these efforts prior to the inception of these institutions. Resources for planning and support would do much to undergird the foundations of these schools.

Finally, university professors may look to the case of Countryside Charter School as a snapshot of one school struggling to develop a curriculum based on the study of food, agriculture, renewable resources and the environment. Questions arise and may be considered--and possibly researched--as agricultural educators broaden their mission to increase the breath of their discipline. These questions include, but are not limited to: (1) What types of knowledge and skills are necessary for teachers to develop an agriculturally-based curriculum?, (2) Do agricultural resource / curriculum / infusion specialists need to be trained by universities for elementary and middle school?, (3) How will universities help build the capacity of pre-and-in-service teachers to develop an integrated agriculturally-based curriculum?, (4) Are there similar cases of charter schools based on agricultural themes that can be studied in detail to glean a deeper understanding of the processes involved in founding such schools?

ERIC Full Text Provided by ERIC

REFERENCES

Birkenholz, R., Frick, M., Gardner, H., and Machtmes, K. (1994). Rural and urban inner-city school student knowledge and perception of agriculture. Proceedings of the twenty-first national agricultural education research meeting, 130-136.

Drake, W. E. (1990). Teacher education: At the heart of the mission reaffirm-reform or both? The Agricultural Education Magazine, 62, 7, 10-11,18.

Erickson, F. (1986). Qualitative methods. In M. Whittrock (Eds.), Research in teaching and learning, Vol. 2. New York: Macmillan.

Frick, M., Birkenholz, and Machtmes, K. (1995). Rural and urban adult knowledge and perceptions of agriculture. Journal of Agricultural Education, 36, 2, 44-53.

Hashew, M. (1986). Effects of subject matter knowledge in the teaching of biology and physics, Paper presented at the Annual Meeting of American Educational Research Association, San Francisco, CA (Eric Document Reproduction Service No. 275502).

Humphrey, J., Stewart, B., and Linhardt, R. (1994). Preservice elementary education majors' knowledge of and perceptions toward agriculture. Journal of Agricultural Education, 35, 2, 27-30.

Jacobs, H. (1989). Interdisciplinary curriculum: Design and implementation. Alexandria, VA: Association for Supervision and Curriculum Development.

Leising, J., & Zilbert, E. (1994). Validation of the California agriculture literacy framework. Proceedings of the twenty-first national agricultural education research meeting, 112-119

Michigan Department of Education. (1996). Michigan standards and benchmarks. Lansing, NU: Author. Michigan Public Act 289: New Charter School Law. (1994). http://www.michiganlegislature.org/law/getobject.asp?Obj=380-501

Miles, M., & Huberman, A. (1984). Qualitative data analysis: A sourcebook of new methods. Beverly Hills, CA: Sage.

National Institute on Student Achievement, Curriculum, and Assessment. (1998, December). Charter Schools: A State Legislative Update. Research Today. www.ed.gov/pubs/ResearchToday/98-3037,html

National Research Council. (1988). Understand agriculture: new directions for education. Washington, D.C.: National Academy Press.

Rudd, R., & Hillison, J. (1995). Teacher characteristics related to the adoption of agriscience curriculum in Virginia middle school agricultural education programs. Journal of Agricultural Education, 36, 2, 19-27.

Strauss, A. (1987). Qualitative analysis for social scientists. Cambridge: Cambridge University Press.

Tannen, D. (1989). Talking voices: Repetition, dialogue, and imagery in conversational discourse. Cambridge: Cambridge University Press.

Terry, R., Herring, D., & Larke, A. (1994). Assistance needed for elementary teachers in Texas to implement programs of agricultural literacy. Proceedings of the Twenty-First National Agricultural Education Research Meeting, 233-240.

Trexler, C., & Miller, N. (1992). Improving scientific literacy through an agriscience curriculum. The Agricultural Education Magazine 65, 4, 14-16, 23.

Trexler C., & Suvedi, M. (1998). Perceptions of agriculture as a context for elementary science teaching: A case of change in Sanilac County, Michigan. The Journal of Agricultural Education 39, 4, 28-36.

FOOTNOTES

[1]This university consultant designed the initial organizational plan for the school. In addition, he met regularly with staff to provide assistance with curriculum development during the summer of 1998. He was formerly a high school agriculture teacher, an administrator of an elementary program that used agriculture as a theme for science education, and a university specialist.

[2]The agriscience program coordinator joined the staff at CCS in August 1998. His primary role, as stated in his job description, was to assist with FARE theme integration and by developing the 75-acre land laboratory. He was previously a high school agriscience education teacher; this was his first experience assisting elementary educators in a formalized role.

[3]The curriculum coordinator joined the staff at CCS in August 1998. Her primary role, as stated in her job description, was to assist teachers with curriculum coordination. She was experienced in elementary and middle school as a teacher and teacher consultant; this was her first year as a curriculum coordinator.

ERIC Full Text Provided by ERIC

DEVELOPING A PROCESS FOR AN ELEMENTARY AND MIDDLE SCHOOL AGRICULTURALLY-BASED CURRICULUM: A CASE OF TEACHER STRUGGLE AT COUNTRYSIDE CHARTER SCHOOL

A Critique

Kirk A. Swortzel
Auburn University

Charter schools have been receiving more attention in recent years. These schools have sought to improve student achievement, stimulate teaching methods, create new professional opportunities for teachers, make schools more accountable, and provide greater choices for students and parents. Such schools take time to get off the ground and most likely encounter problems during the first years. Charter schools have started becoming a topic on agricultural education and it is time for the agricultural education profession to examine the impact of such schools on agricultural education. I commend the authors for addressing this important topic as we possibly could face the topic in our respective states as well.

The authors did a good job of providing the background, theoretical framework, and conceptual framework for the study. The purposes and research questions were clearly stated. Qualitative research methods were used to collect date for this study and appropriate analysis procedures were used.

It was interesting to read the results of the study and the comments of the teachers involved in developing an agriculturally based curriculum. Most of the teachers had little to no teaching experience with the exception of one teacher. I am curious what criteria was pre-established (if any) for the hiring of teachers for the charter school.

It is apparent that the curriculum development process was a painful one, especially at the onset with many of the teachers having little or no experience in curriculum development. As the teachers began to feel comfortable in their positions and got a year of teaching under their belt, the curriculum development process became somewhat easier as compensation was provided during the summer months for curriculum development. While this comment goes beyond the context of the study, I wonder if maybe they should have waited a year to open the school given the fact that neither the facilities nor the curriculum was ready to go.

The teachers had many concerns about jumping into this situation and provided many suggestions to the authors regarding how future curriculum could be developed. The ultimate success of the charter school in terms of integrating agricultural concepts into the curriculum will depend on how successful the teachers are in planning, developing, and implementing the curriculum. Though there was improvement the second year, there is still room for improvement as teachers continue to seek to develop a strong agriculturally-based curriculum.

I commend the authors for addressing an interesting topic. I had some difficulty in reading the paper due to organization and layout of the paper. I encourage the authors to spend some time in editing this paper because I believe there is some valuable information to be shared here. I hope this charter school is successful in providing an agriculturally-based curriculum and encourage the authors to continue their work in this area.

ERIC

NAERC '99
Research Fresh from Florida

Measuring the Ethical Cognition Effect of a Videotape Livestock Show Ethics Education Program

Jeff Goodwin
University of Idaho

Gary Briers
Texas A&M University

Tim Murphy
Texas A&M University

INTRODUCTION AND THEORETICAL FRAMEWORK

The issue of livestock show ethics gained public attention in 1994 as residues of clenbuterol were discovered in several major livestock shows in the United States. The Food and Drug Administration (FDA) acted on concerns about possible adverse effects of clenbuterol residues on public health (Rodrigquez, 1995).

In a provocative 1990 study of 1,945 participants of the Houston Livestock Show and Rodeo, Murphy (1992) found that 25% of the respondents had knowingly used illegal drugs in preparing market animals for showring competition. Even though "steroids" are contraband in this country, 7.9% of respondents indicated they had given these substances to market animals. Of those responding, 42.5% had illegally used tranquilizers in their animals and 37.5% admitted to falsification of data on livestock registration certificates. The authors of this paper noted that Murphy (1992) referred to the compound clenbuterol as a "steroid" even though it is not actually classified as a steroid, but as a beta-agonist. Also, while clenbuterol was cleared for use in the United States for the treatment of horses in 1998, at the time of the study the drug was a contraband substance.

ERIC

These unscrupulous practices not only threaten the future existence of 4-H and FFA youth development programs involving livestock, they also threaten consumer confidence in a safe and wholesome food supply. As a result, ethics educational efforts have been implemented in many states nationwide. The essence of livestock show ethics education is expressed as Coffey and Goodwin (1995) stress the importance of breaking the "curtain of silence" that the unethical few work behind.

This study not only explores the issues of ethical decision making made by individuals involved with youth livestock shows, it also has a strong foundation in the moral reasoning theory advanced by researchers such as Piaget, Dewey , and Kohlberg. In Kohlberg's view, the aim of moral education is to encourage individuals to become autonomous moral agents. They should make decisions about what is right and wrong based on moral principles rather than on selfish and peer-influenced motivations (Benninga, 1990).

According to Kohlberg (1984), moral reasoning develops through a sequence of six stages. These are grouped into three major levels, namely the Preconventional level (Stages 1 and 2), the Conventional level (Stages 3 and 4), and Postconventional level (Stages 5 and 6). To understand the six stages, it is best to start by understanding the three moral levels. The Preconventional moral level is the level of most children under 9, some adolescents, and many adolescent and adult criminal offenders. The individual at the Preconventional level has not yet come to really understand and uphold conventional or societal rules and expectations. The Conventional level is the level of most adolescents and adults in our society and other societies. The term "conventional" means conforming to and upholding the rules, expectations, and conventions of society or authority just because they are society's rules, expectations, or conventions. The Postconventional level is reached by a minority of adults and is usually reached only after the age of 20. Someone at the Postconventional level understands and basically accepts society's rules, but acceptance is based on formulating and accepting the general moral principles that underlie these rules. Within each of the three moral levels, there are two stages. The second stage is more advanced than the first. The six moral stages are further described in Figure 1 in terms of what is right, and the reason for upholding the right.

Level and Stage	What is Right?	Reasons for Doing Right
Level I: Preconventional Stage 1 – Heteronomous Mortality	To avoid breaking rules backed by punishment.	Avoidance of punishment
Stage 2 – Individualism	Following rules only when it is to someone's immediate interest	To serve one's own needs or interests
Level II – Conventional Stage 3 – Mutual Interpersonal Expectations and Relationships	Living up to what is expected by people close to you or what people generally expect people in your role. "Being good" is important and means having good motives, showing concern about others. It also means keeping mutual relationships, such as trust, loyalty, respect, and gratitude.	The need to be a good person in your own eyes and those of others. Your caring for others. Belief in the Golden Rule. Desire to maintain rules and authority which support stereotypical good behavior.
Stage 4 – Social System and Conscience	Fulfilling the actual duties to which you have actually agreed. Laws are to be upheld except in extreme cases where they conflict with other fixed social duties. Right is also contributing to society, the group, or institution.	To keep the institution going as a whole, to avoid the breakdown in the system "if everybody did it," or the imperative of conscience to meet one's defined obligations.
Level III – Postconventional or Principled Stage 5 – Social Contract or Utility and Individual Rights	Being aware that people hold a variety of values and opinions, that most values and rules are relative to your group. These relative rules should usually be upheld, however, in the interest of impartiality and because they are the social contract. Some nonrelative values and rights like life and liberty, however, must be upheld in any society and regardless of majority opinion.	A sense of obligation to law because of one's social contract to make and abide by laws for the welfare of all and for the protection of all people's rights. Concern that laws and duties be based on rational calculation or overall utility, "the greatest good for the greatest number."
Stage 6 – Universal Ethical Principles	Following self-chosen ethical principles. Particular laws or social agreements are usually valid because they rest on such principles. When laws violate these principles, one acts in accordance with the principle. Principles are universal principles of justice: the equality of human rights and respect for the dignity of human beings as individual persons	The belief as a rational person in the validity of universal moral principles, and a sense of personal commitment to them.

Figure 1. Kolberg's Stages of Moral Reasoning

ERIC

Moral education consists of promoting change or development through these stages as an individual interacts with his or her environment and makes sense of those experiences. Even at low stages people are able to make claims about what is right and wrong, but Kohlberg contends that people at higher stages of moral development are more likely to act in accordance with their moral judgments. For Kohlberg, psychological development of the individual is the primary aim of education and is promoted by engaging in discussions of moral issues and dilemmas -- both hypothetical and real. Participating in these discussions helps students to recognize and understand the perspectives of others and to have their own reasoning supported at times and challenged at others (Benninga, 1990).

In his approach to moral education, Kohlberg placed explicit emphasis on the process of making moral choices. Kohlberg did not believe virtues could be taught didactically but rather that both the concept of justice as well as the individual's understanding of it were constructed through experiences with the moral world (Benninga, 1990). Rather than focusing on a list of virtues to be transmitted to students, Kohlberg argued that virtue and justice were synonymous and that the "teaching of virtue [justice] is the asking of questions and pointing the way, not the giving of answers. Moral education is the leading of men upward, not the putting into the mind of knowledge that was not there before" (Kohlberg, 1970).

The authors of this paper contend that the experimental treatment imposed in this study aids and promotes higher level moral reasoning as described by Kohlberg. The three operational "Line in the Sand" questions employed in this study are examples of helping point the way for youth and adults instead of simply communicating a list of "do's and don'ts."

The instructional program used as the treatment in this study was delivered via videotape. One advantage of this delivery medium is the assurance of more consistent treatment experiences among the diverse populations sampled. The effectiveness of videotape as a delivery medium for educational programming is generally held to be quite high, certainly equal to traditional face-to-face educational programs. According to Atherton and Buriak (1988), "...video can be just as effective or more effective than other forms of instruction" (p. 70). Whittington (1987), in a review of the research available, concluded that the specific medium, videotape or instructor led presentation, used to deliver instruction had no impact on instructional effectiveness.

Many states have aggressively implemented ethics educational efforts to 4-H and FFA audiences. The question at hand then is, does the effort in presenting such educational programs enable a positive difference in the actions of individuals at youth livestock shows?

PURPOSE AND OBJECTIVE

The purpose of the study was to determine the effectiveness of a videotaped ethics educational effort directed to individuals involved in youth livestock shows (e.g. 4-H and FFA members, parents, FFA Advisors, and Extension Educators).

To accomplish this purpose, the research objective was to determine their ability to correctly sort a list of livestock showing practices as either ethical or unethical. This ability was assessed both before and after exposure to a livestock show ethics education video program.

METHODS AND PROCEDURES

Three questions were used to determine if a particular practice was ethical or unethical. These questions were developed through an analysis of the available literature for use in the ethics education video "Line in the Sand" (Goodwin, 1996). This video has been adopted for use in all 50 states since its introduction in the fall of 1996. The ethical test offered in the video is a three step test composed of the following questions to assist individuals in discerning whether or not a particular practice involved in the showing of livestock is acceptable. The questions used are:

1. Does the practice violate FDA law? An example is the use of a substance not cleared for food animal use (e.g. certain diuretics, tranquilizers, anti-inflammatory agents, and feed additives).
2. Is it a fraudulent misrepresentation of the animal? Is it fraud? Examples include false ownership, falsified birth dates and ownership dates, and surgical manipulation of the animal.
3. Does the practice compromise the welfare of the animal? Examples include excessive short docking of lambs resulting in higher incidence of rectal prolapse, or severe restriction of feed and water to control weight.

If any of the above questions are answered yes, the practice in question is ethically unacceptable based on the construct proposed in this study.

This three step ethical test is actually a direct method of framing a given issue into, and impressing upon individuals to engage in, higher level universal ethical principle development which could be considered parallel to Kohlberg's (1970) higher level moral reasoning.

This presumption, that the construct offered above is a valid test of the ethical or unethical nature of a practice, has been scrutinized by a wide variety of audiences in many states. There has never been a valid argument against the three "Line in the Sand" questions reported by a presenter of the information in the United States to the producer of the video. The producer of the video has presented the three question test to over 5,000 people in ten states and has never had an audience member contest the validity of the three question ethical test. As stated by Ann Swinker, Extension Equine Specialist at Colorado State University, "The three question ethical test in the 'Line in the Sand' video has become the standard on which livestock showing practices are now measured in the state of Colorado, where the video is in use in every county in the state" (personal communication, April 30, 1997).

During the first nine months of 1997, 918 individuals involved in youth livestock shows in six states participated in this study. Data were collected from 4-H and FFA members, parents, FFA Advisors, and Extension Educators in Oklahoma, Idaho, Alabama, Washington, Oregon, and Ohio.

A posttest-only control group experimental design was utilized in the study. Participants in the study were randomly selected to the treatment or the control group based on where they sat in the rooms used to deliver the ethics education programs. Control group participants were asked to sort a list of eight livestock showing practices as either ethical or unethical prior to the audience being exposed to the experimental treatment (viewing the Line in the Sand videotape). The

treatment group participants sorted the same list of practices after exposure to the treatment.

The eight livestock showing practices included on the instrument to be sorted as either ethical or unethical included:

1. Twine glued to cattle in order to exhibit the animal at its best advantage.
2. Clipping, fitting, and grooming an animal in order to exhibit the animal at its best natural advantage.
3. Changing the color pattern of an animal so that it can be shown in another breed classification.
4. False Ownership - Showing an animal that really doesn't belong to you.
5. Drenching an animal with water in order to meet a minimum weight requirement.
6. Cleaning or polishing the hooves of an animal (if not against the rules of the show).
7. Drenching an animal with water in order to express capacity and volume in a breeding animal.
8. The use of a diuretic (such as Lasix) in order to meet a weight requirement.

According to the three "Line in the Sand" questions proposed as a guide to determine the ethical or unethical nature of a livestock showing practice, situations 2 and 6 are ethical and situations 1, 3, 4, 5, 7, and 8 are unethical. These were considered the "correct" responses to the instrument for the purposes of this study.

As an indication of internal consistency, Cronbach's Alpha was calculated for the eight questions included on the instrument and found to be .64.

FINDINGS

Demographics: This study involved programs held in six states during the first three quarters of 1997. In all, 918 individuals completed survey instruments. The respondents were asked to choose one of six roles that best described their involvement in youth livestock showing activities. The roles included: 4-H or FFA member, 4-H or FFA parent, Agriculture Teacher, County Extension Agent, 4-H Leader, College Student, and Other. When more than one response was selected (parent and 4-H Leader) professional or advisory roles were included for analysis. A few respondents failed to select a role. The results are summarized in Table 1.

Table 1

Respondents By State By Role

State	4-H or FFA	Parent	Ag Teacher	Ext. Agent	4-H Leader	College Student	Other	No Role	Total
WA	22	4	124	2	6	1	6	1	166
OR	94	12	12	1	2	3	8	3	135
OK	200	63	1	5	11	21	17	0	318
OH	84	42	3	10	31	0	15	0	185
ID	4	5	0	39	21	2	12	1	84
AL	0	1	1	25	0	0	3	0	30
Totals	404	127	141	82	71	27	61	5	918

While the treatment was randomly assigned, this study involved intact groups who were, in some manner, self-selected through their participation in an ethics education presentation. Caution is warranted in making inference beyond the sample population described here.

Effectiveness of Video Ethics Program: When analyzed together (n=918), the participants did quite well on the test. The mean score of the control group was 91.75% (7.34 of 8.0), while that of the treatment group was 95% (7.64 of 8.0). There was a statistically significant difference between the control and treatment groups' ability to correctly sort the eight livestock showing practices. The t-test results are reported in Table 2.

Table 2
t-Test for Equality of Score Means By Treatment

	N	M	t	df	Sig. (2-tailed)
Control	418	7.34	4.398	916	.000
Treatment	500	7.64			

Some individuals in the study had previously been exposed to "The Line in the Sand" educational video. When these 33 individuals were separately analyzed as a treatment group against the control group, there was a statistically significant difference in their ability to sort the eight practices as ethical or unethical (p = .045). While no information was collected to determine when they had previously seen the program, this result appears to indicate at least some level of retention.

Interestingly, all 33 of the participants who had previously been exposed to the "Line in the Sand" video were placed in the control group. Probably due to the small number involved, moving these individuals' data to the treatment group had no effect on the highly significant difference between the responses of the revised treatment and control groups.

Sixty-two individuals had previously been exposed to the "A Question of Ethics" (1994), or "A Step Beyond:" (1995) videos also produced by Jeff Goodwin. When these individuals were separately analyzed as a treatment group against the control group, there was a significant difference in their ability to sort the eight practices as ethical or unethical (p = .028).

While the treatment was clearly effective in increasing the mean score achieved on the instrument by the participants, in the judgement of the researchers, only a perfect score could indicate the presence of the necessary level of ethical cognition Kolberg described as prerequisite to ethical behavior. In this view, one either possesses the necessary level of ethical reasoning or one does not. The degree to which a given respondent lacked the prerequisite cognitive ability to behave ethically was deemed unimportant.

To investigate this hypothesis, a new variable was created. A "0" was assigned to those individuals who missed even one of the eight questions, and a 100 to those who correctly sorted all eight livestock showing practices. Additional tests were conducted to determine the number of

ERIC Full Text Provided by ERIC

perfect scores in the sample populations before and after the treatment, and the probability that any differences in the sample populations occurred by chance. These results are summarized in Table 3.

Table 3
Change in Frequency of Perfect Scores

Group	Score 0	Score 100	Total	X^2	p
Control	150	268	418	27.412	.000
Treatment	102	398	500		
Total	252	666	918		

The Chi-Square statistic did exceed the tabulated value at the alpha established apriori ($p<.05$), thus the null hypothesis (that the populations would show a homogeneity of distribution) was rejected. The treatment resulted in a higher-than-expected percentage of perfect scores. In the control group, 64.1% of the subjects (268 of 418) achieved a perfect score. On the other hand, 79.6% (398 of 500) of the subjects exposed to the treatment achieved a perfect score. Subjects in the treatment group were better able to correctly identify all eight of the livestock showing practices as either ethical or unethical. So, the treatment was deemed effective in altering the subjects' knowledge about acceptable and unacceptable practices.

The fact that 64.1% of the control population achieved a perfect score tends to support Coffey and Goodwin's (1995) supposition that the majority of livestock show participants behave ethically. For some people, this could lead to a conclusion that the comparatively small number of people involved reduces the significance of the problem. Unfortunately, history has demonstrated that a small number, or even one, unethical act can trigger an overwhelming response in the form of public outcry and governmental regulation.

Inservice Needs by State: In order to attempt to identify the topics most necessary to direct effective remediation, the researchers were interested in determining the percentage of correct responses on each of the eight items from among those respondents who did not achieve a perfect score. Because inservice educational efforts are normally, almost exclusively, generated, coordinated, delivered, and supported within a state, the percentage of correct responses on each question was organized by state. Due to the relatively small cell sizes, and the extremely unbalanced sample sizes, comparisons among or between states are contra recommended.

The question with the lowest single score was, "Drenching an animal with water in order to express capacity and volume in a breeding animal." This was closely followed in a different location by, "Twine glued to cattle in order to exhibit the animal at its best advantage." Clearly the educational needs differ in these two locations. The tabulated results are presented in Table 4.

Table 4
Percentage of Correct Scores from those scoring less-than-perfectly By Question By State

Item	OK	ID	AL	WA	OR	OH
n	117	14	8	36	45	30
Twine glued to cattle in order to exhibit the animal at its best advantage	74.4	38.5	87.5	54.5	61.5	80.0
Clipping, fitting, and grooming an animal in order to exhibit the animal at its best natural advantage	96.6	84.6	87.5	90.9	90.2	93.3
Changing the color pattern of an animal so that it can be shown in another breed classification	89.7	78.6	100	88.9	77.8	96.7
False Ownership - Showing an animal that really doesn't belong to you.	72.6	92.9	100	88.9	84.4	93.3
Drenching an animal with water in order to meet a minimum weight requirement.	74.4	100	85.7	88.9	79.1	86.7
Cleaning or polishing the hooves of an animal (if not against the rules of the show).	87.2	76.9	62.5	91.7	81.4	85.2
Drenching an animal with water in order to express capacity and volume in a breeding animal.	40.2	80.0	25.0	47.1	40.9	33.3
The use of a diuretic (such as Lasix) in order to meet a weight requirement.	82.1	90.9	100	86.1	79.5	89.7

Inservice Needs by Role: Effective educational programs are usually designed with a particular audience in mind. According to Dick and Carey (1996), knowledge of the intended learner's skills, preferences, and attitudes is crucial to designing effective instruction. The researchers were therefore interested in determining the percentage of correct responses on each of the eight items from among those respondents who did not achieve a perfect score organized by role. Due to the relatively small cell sizes, and the extremely unbalanced sample sizes, comparisons among or between roles are contra recommended.

Perhaps not surprisingly, here again the question with the lowest single score was, "Drenching an animal with water in order to express capacity and volume in a breeding animal." This was closely followed from a different group by, "Twine glued to cattle in order to exhibit the animal at its best advantage." On some items, the respondents achieved a perfect score. Clearly the educational needs differ among these groups. Educational programming appropriate to one, may address issues resolved through other means in another. The tabulated results are presented in Table 5.

Table 5
Percentage of Correct Scores from those scoring less-than-perfectly By Question By Role

Question	Other	4-H/ FFA	Parent	Ag Teacher	Ext. Agent	4-H Leader	College Student
n	18	138	18	30	16	14	11
Twine glued to cattle in order to exhibit the animal at its best advantage	68.8	75.6	87.5	41.4	62.5	71.4	54.5
Clipping, fitting, and grooming an animal in order to exhibit the animal at its best natural advantage	100	94.9	93.8	96.7	87.5	85.7	100
Changing the color pattern of an animal so that it can be shown in another breed classification	77.8	87.0	83.3	96.8	87.5	100	90.9
False Ownership - Showing an animal that really doesn't belong to you.	94.4	71.7	100	90.0	93.3	92.9	90.9
Drenching an animal with water in order to meet a minimum weight requirement.	88.9	72.8	94.4	96.7	93.8	85.7	81.8
Cleaning or polishing the hooves of an animal (if not against the rules of the show).	75.0	87.5	76.5	93.5	75.0	92.3	100
Drenching an animal with water in order to express capacity and volume in a breeding animal.	37.5	37.2	23.5	62.1	50.0	58.3	36.4
The use of a diuretic (such as Lasix) in order to meet a weight requirement.	66.7	83.2	94.1	96.8	100	92.3	54.5

CONCLUSIONS

No claims are made regarding the change of unethical behavior at youth livestock shows as a result of exposure to the educational program serving as the experimental treatment in this study. However, the authors contend that a change in ethical cognition did occur in the treatment group, and that this change was due to the treatment. The authors also contend that this change in ethical cognition or knowledge is essential and prerequisite to positive changes in attitude and finally behavior. As ethical behavior is the desired outcome of all ethics education efforts, additional research is needed to determine the relationship between ethical cognition and ethical behavior regarding the particular issue of livestock show ethics.

Variability exists in educational need among and between groups of learners both by their location and by their role. Further investigation is needed within each of these sub-samples to

identify and target educational programming that will most appropriately address their needs.

The individuals who had previously seen the "Line in the Sand," "A Question of Ethics, " or "A Step Beyond:" livestock show ethics education videotapes produced by Jeff Goodwin were better able to correctly identify the livestock show practices as either ethical or unethical. Since no effort was made to control external variables, this could have been due to the effect of the educational programs, or simply served to identify those individuals who had previously sought such information as people who see a need to address the issue of livestock show ethics.

REFERENCES

Atherton, J. & Buriak, P. Video Simulation as a Computer Applications Instructional Technique for Professionals and Students. Journal of Vocational Education Research, 13, (3), pp. 59-71.

Benninga, J. S. (1990). Moral Character and Civic Education in the Elementary School. Teachers College Press, 42-64.

Coffey, D. M., & Goodwin, J. L. (1995). Ethics in Exhibiting and Showing Livestock -- Facing Reality. The Agricultural Education Magazine. 68, 10-11.

Dick, W., & Carey, L. (1996). The systematic design of instruction. (4th Ed.). New York: HarperCollins.

Goodwin, J. L. (1996). "The Line in the Sand" [Videotape]. Available from Instructional Materials Service, Mail Stop 2588, Texas A&M University, College Station, Texas 77843-2588, (409) 845-6601.

Kolberg, L., (1970). Education for Justice: A Modern Statement of the Platonic View. In N.F. Sizer & T.R. Sizer (Eds.) Moral education: Five lectures (pp. 57-83). Cambridge, MA: Harvard University Press.

Kohlberg, L. (1984). The Psychology of Moral Development. New York: Harper & Row. Pages 172-177.

Murphy, T. E., Norwood, S. N., & Dubes, R. (1992). Unethical Fitting and Showing Practices in Junior Livestock Shows. Texas Journal of Agriculture and Natural Resources, 5, 99-106.

Rodrigquez, R. R.. (1995). The role of USDA in residue avoidance. National Youth Livestock Program Ethics Symposium Conference Proceedings. Pages 114-117. Livestock Conservation Institute, 1910 Lyda Drive, Bowling Green, Kentucky 42104-5809.

Whittington, N. (1987). Is instructional television educationally effective? A research review. The American Journal of Distance Education. 1, (1), 47-57.

MEASURING THE ETHICAL COGNITION EFFECT OF A VIDEOTAPE LIVESTOCK SHOW ETHICS EDUCATION PROGRAM

A Critique

Paul R. Vaughn
Texas Tech University

The authors have done an excellent job in reviewing the literature and providing the theoretical framework for the study. The review clearly notes the concerns associated with livestock exhibiting and the need for ethical conduct of those who participate in this activity. The rationale for using the methodology in the study is also clearly explained, and a convincing argument is presented for most of the procedures that are utilized. The authors are also to be commended for addressing an issue that is difficult to measure and evaluate.

Other positive aspects of the research include the large sample size and the administration of the treatment in several states. Both of these factors greatly enhance the external validity of the study. Another excellent procedure included measuring (or at least addressing) validity and reliability of the instrument that was used to measure effectiveness.

It is rare to find a research study that is error free. In fact, education research is usually the process of minimizing errors, rather than eliminating them. In this regard, I commend the authors for identifying some of the problems associated with their research and alerting the reader to be cautious with some of the interpretations. This type of approach is one that not only helps the reader but also aids in improving future research studies that address the same issue.

<u>The following are questions that arose from reading the study:</u>

Was the study a "true" experiment? It was reported as being experimental in nature, more specifically, as a posttest only control group experimental design. Yet, the procedures indicate that the <u>subjects were not randomly assigned</u> to groups. Instead, <u>the treatment was randomly assigned</u> to intact groups. This type of design is often referred to as a "quasi" experiment rather than a "true" experiment. Most educational research methodology texts include a discussion of the dangers of using a quasi-experimental design to make cause-effect statements.

If the design was "posttest only," why did the authors report that an assessment was conducted both "before and after" the treatment? Was the design actually a non-equivalent control group design (a quasi-experiment which includes a pretest)?

Was the treatment assigned to the intact groups in a random manner? The authors note it was, but then go on to say that people were assigned to the treatment depending on "where they sat in the room." Did each group have an equal and independent chance of being selected?

Is the "highly significant" difference reported by the authors a meaningful difference? With the "control" group scoring 7.34 and the treatment group scoring 7.64 on a scale of 1-8, the "significant" difference seems to be more a function of sample size rather than educational significance. Put another way, is a videotape "effective" if it only produces such a tiny move up

ERIC Full Text Provided by ERIC

the scale? If the control group had been given a handout to review, would their scores have matched the treatment group? Or been higher? Would a handout be a better alternative than the videotape?

Was the statistical analysis appropriate? The adjustment of the variance in the scores (using 0 & 100) is confusing and seems illogical. I would encourage the authors to explore using discriminate analysis and a coding of 0 for non-perfect scores and 1 for perfect scores.

ERIC

NAERC '99

Research Fresh from Florida

Status of Community Service-Learning in 4-H Programs

John Wyble
Louisiana Cooperative Extension

Joe Kotrlik
Louisiana State University

INTRODUCTION/THEORETICAL BASE

A major part of a 4-H club for youth is participation in community service-learning activities through project work, either on an individual basis or as a group with fellow club members (Mullen, S., personal communication, November 17, 1998). Community service-learning by 4-H youth is certainly not a new concept. It is such a strong part of the 4-H program that sometimes it is overlooked or presumed to be a natural part of the learning process in 4-H Youth Development. While community service-learning has recently become popular in the world of "formal" education, it has clearly been an objective of 4-H for many years.

There is much debate over how the service should be rendered and who should benefit from it. At the center of this debate are two issues. The first issue is what exactly should be the purpose of community service-learning. Should community service-learning be a tool to encourage and increase volunteer hours by youth. Or should it be the vehicle that transports the participants to a state of being aware of personal, intellectual, and social value of themselves to the community. The second issue is who should be held responsible for teaching about civic and community involvement. Should it be educational institutions, civic organizations and extracurricular clubs, or all of them (Shumar, 1987)?

Community service is currently a hot topic because youth are often perceived as selfish, or self-serving. Yet, research shows that young people are eager, hungry, and enthusiastic about serving their respective communities (Kendall, 1990).

Often, little distinction is made between community service and community service-learning. However, community service and community service-learning are two distinct concepts. Community service is volunteering done in the community without any structured or formal attachment to the outcomes. The focus here is on the program itself and not on the learning outcomes of the participants, although the possibility of participants learning while volunteering certainly does exist (Perkins, 1994).

Service-learning, on the other hand, is a 20-year-old approach to experiential education which developed out of concerns expressed in the 1960's and 1970's for active, experiential learning opportunities related to community service, community development, and social change. One definition of service-learning is the combining of structured, intentional learning with public and community service (Stanton, 1987). In emphasizing the accomplishment of tasks which meet human needs in combination with conscious educational growth, service learning is the crossing point between theory and practice, and self and society (Goodlad, 1988). It expresses a commitment that sees knowledge developed out of social practice (Kendall, 1990).

Opportunities for young people to serve stimulate skills that one would not readily think of, but yet, skills necessary for future employment. These skills include punctuality, reliability, responsibility for task completion, getting along with peers, and personal development (Harrison, 1987).

Involving young people in community affairs, including community service-learning projects, can build strong, positive relationships between students, teachers, and citizens in a community, while helping to improve the conditions and solve the problems of their community. Youth can also increase their understanding of their community, while also increasing their commitment to their community. Furthermore, they can become empowered to work toward solving local problems (Israel & Ilvento, 1995).

Research shows concrete evidence that the need for young people to serve their communities is a true win-win situation. A Search Institute study of 47,000 young people in grades six through twelve found that those youth who served at least one hour per week in a community service-learning activity were less likely to engage in at-risk behaviors (Benson, 1993). Furthermore, it has also been found that experience during a youth's adolescence helps to shape values throughout that young person's life, suggesting that early participation in community service-learning activities results in long-term rewards such as a lower school drop out rates, lower percentages of teen pregnancy, and lower rates of behavioral problems (Conrad & Hedin, 1986).

A study conducted by the Florida Department of Education provided data supporting improvements in three critical areas by the 20,000 students involved in community service-learning activities through school. Those areas that were positively affected included grades, attendance, and discipline (Follman, 1996).

Research continues to show that community service-learning programs can assist young people in developing a better understanding of their community, themselves, and their role as a citizen. Participation in these activities can increase the participant's self-confidence, as well as their confidence in contributing to society. While participation in community service-learning activities is not the only means of meeting the necessary conditions for creating involved citizens, it remains a vital part in that process.

While 4-H youth have always been involved in countless hours of community service-learning projects and activities, no studies have been conducted of community-service learning as conducted in 4-H programs. With new initiatives being taken by the National 4-H Council to involve more youth in community service-learning, and with the potential to strengthen 4-H youth development programs, a need exists to determine the status of community-service learning in 4-H programs.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the status of community service-learning in Louisiana 4-H programs. The research questions addressed in this study included:

1. How can community service-learning in 4-H be described using the following selected characteristics: type of activity, number of times activities occurred, frequency of activity, and number of participants by school level?
2. What value do extension 4-H agents perceive community service-learning activities has for participants?
3. What process is used by extension 4-H agents for planning and implementing community service-learning activities?
4. What do extension 4-H agents perceive as the capability of 4-H members to initiate and participate in the planning process for community service-learning activities?
5. What do extension 4-H agents perceive as their own training needs in the area of community service-learning?
6. How can extension 4-H agents who coordinate community service-learning activities be described using selected demographic characteristics(age, years of experience as an extension 4-H agent, undergraduate studies, and whether or not formal training has been received in the area of community service-learning)?
7. Do relationships exist between the value of community service-learning as perceived by extension 4-H agents and the following demographic characteristics of the agents: age, years of experience as an extension 4-H agent, and formal training received in the area of community service-learning?

PROCEDURES

Population

The target population was 123 extension agents employed with the Louisiana Cooperative Extension Service whose primary job responsibility was the development of youth enrolled in the 4-H Youth Development Program and who had at least one year of experience with the Louisiana Cooperative Extension Service. A census of 4-H extension agents was taken.

Instrumentation

An instrument was available from a similar study recently conducted by the Wisconsin Cooperative Extension Service (Taylor-Powell, 1997). The instrument from the Wisconsin study did not meet the needs of this study but did serve as a foundation for the instrument for this study. Additional input was provided by state 4-H staff, extension agents, and departmental faculty. This input along with concepts and information taken from the review of the literature was used to design the final draft.

The validation panel included three members of the university faculty and the Director of the Governor's Office of Service-Learning, who recently completed a thesis in the area of community service-learning. This panel evaluated the content and face validity of the instrument. Their comments and suggestions were incorporated into the final survey instrument.

The survey instrument was field tested with ten extension agents who had prior experience in 4-H Youth Development, but were no longer doing such work. No major concerns were identified as a result of the field test, therefore, no significant changes were made to the instrument as a result of the field test.

Internal consistency was calculated for the four scales included in the survey instrument. The first scale was a cluster of 11 items designed to measure the perceived value of service-learning. The internal consistency of this scale was calculated as $\underline{a} = .91$. The second scale, a cluster of nine items designed to measure the planning process used for service-learning activities, had an internal consistency of $\underline{a} = .88$. The internal consistency for the third scale was $\underline{a} = .87$. This cluster of 12 items was designed to measure the perceived capability of youth to participate in service-learning planning. The fourth scale, a cluster of eight items, was designed to measure the training needs of extension agents to coordinate service-learning activities. This scale had an internal consistency of $\underline{a} = .82$.

Data Collection

A letter was sent by the Division Leader for 4-H Youth Development within the Louisiana Cooperative Extension Service to notify extension agents about the survey instrument and to indicate that both the Division Leader and Director of the Cooperative Extension Service requested that agents complete and return the survey instrument. Two mailings (instrument with cover letter), three interspersed e-mail messages, and a telephone follow-up were used to collect the data. These procedures resulted in a 95.1`% response rate (117 out of 123).

Data Analysis

Descriptive statistics were used for objectives one through six. Spearman and Pearson correlation coefficients were used for objective seven.

FINDINGS

Research question one was designed to provide a benchmark of the community service-learning activities ongoing in Louisiana 4-H clubs. The description was provided from the agents' perspectives, so it was realized that not every activity conducted at the club level could be reported. What was sought, however, was a summation of the type of activities and the number of 4-H members involved in these activities.

Eighty-seven (87) respondents (N=117) completed Section 6 of the survey instrument, which requested information describing current community service-learning activities. A total of 415 service-learning activities were reported by the respondents as being conducted 2,182 times during the year. These activities involved 28,208 students at the elementary school level, 14,388 at the junior high level, and 12,193 students at the high school level. It should be noted that virtually all 4-H clubs in Louisiana are school based.

Research question two addressed the issue of the respondents' perceptions of the value of community service-learning. Responses were reported using a four point scale (1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree). From this cluster of items, the respondents indicated a belief that community service-learning activities were valuable to 4-H youth who participated in such activities (Table 1). Over 94% indicated that they strongly agreed or agreed that community service-learning activities were an important part of 4-H. Almost all (99.1%) strongly agreed or agreed that community service-learning activities increased the participants' understanding of their community.

Research question three addressed the extent to which extension 4-H agents currently used the elements in the planning process for community service-learning activities. Responses were reported using a four point scale (1=Never, 2=Rarely, 3=Sometimes, and 4=Always). The question also identified agencies and organizations used as partners in community service-learning activities. Most of the respondents (95 or 81.2%) indicated that participants and coordinators were sometimes or always assigned responsibilities during the planning process for community service-learning activities. However, only 53.9% indicated that time for reflection was always or sometimes included at the completion of community service-learning activities. Approximately 88% of the respondents indicated that other groups and organizations were identified and used as partners for community service-learning activities. While some steps of the planning process for community service-learning were being utilized, the entire process was rarely conducted.

The respondents were also assigned a score from 9 (never used any of the nine planning elements) to 36 (always used all nine of the planning elements) based on their responses to this cluster of items. Twelve respondents scored 18 points or less, which indicated they rarely or never used the planning process. Only thirty-five respondents (30.0%) scored from 28 to 36 points, which indicated that they used most or all of the planning process steps.

Research question four included a cluster of twelve items designed to address the agents' perceptions of 4-H members' capability to participate in the planning process for community service-learning activities. Responses were reported using a four point scale (1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree). As a group, the respondents generally indicated a strong belief that youth were capable of participating in the planning process and were

capable of giving input to selecting community service-learning activities (Table 2). A total of 110 respondents, or 94.0%, strongly agreed or agreed that 4-H members were capable of initiating ideas for community service-learning activities. In contrast, only 59.0% strongly agreed or agreed that 4-H members should be allowed unlimited input. Approximately three-fourths strongly agreed or agreed that 4-H members were excited about opportunities to serve their communities, were able to identify potential agencies and/or organizations as potential partners, and were capable of developing objectives and methods of reflection for community service-learning activities.

Table 1
Perceived Value of Community Service-learning by Extension 4-H Agents

Statement	Agreed or strongly agreed		M	SD
	f	%		
Participating in Community Service-learning activities help participants gain a better understanding of their community and issues facing society.	116	99.1	3.6	0.5
Community Service-learning has a positive impact on 4-H members.	114	97.4	3.4	0.6
Community Service-learning activities increase the knowledge of 4-H youth about their community.	112	95.7	3.4	0.6
Community Service-learning activities increase the participants' human relations skills.	112	95.7	3.3	0.6
Community Service-learning activities are an important aspect of 4-H youth programs.	111	94.8	3.4	0.6
Community Service-learning activities increase participants' self-confidence.	108	92.3	3.3	0.6
Community Service-learning activities increase the participants' initiative to take an active role in their community.	106	90.6	3.2	0.6
Community Service-learning activities are an important part of the educational process.	105	89.7	3.2	0.6
Community Service-learning participants are less likely to engage in at-risk behaviors such as crime, school suspension, dropping out of school, drugs, alcohol, etc.	102	87.2	3.2	0.6
Community Service-learning should be stressed more in 4-H.	92	78.7	3.1	0.7
Community Service-learning activities are more valuable to the participant's experience than community service activities.	74	63.2	2.8	0.8
Grand Mean			3.3	0.5

The cluster of items for Research Question Five were designed to determine the respondents' perceptions of their own training needs. Responses were reported using a four point

scale (1=Strongly Disagree, 2=Disagree, 3=Agree, and 4=Strongly Agree). Approximately one-third (35.9%) strongly agreed or agreed that they were familiar with recent research on community service-learning (Table 3). Over 71% indicated an interest in additional training. In addition, 86.3% strongly agreed or agreed that training would improve the quality of 4-H community service-learning activities.

Table 2
Capability of Youth to Participate in Community Service-learning Planning, as Perceived by Extension 4-H Agents

Statement	Agreed or strongly agreed		M	SD
	f	%		
4-H members in my parish are capable of initiating ideas for Community Service-learning activities.	110	94.0	3.2	0.6
4-H members in my parish are capable of participating in the planning process for implementing Community Service-learning activities.	109	93.1	3.3	0.6
4-H members in my parish are capable of participating on a Community Service-learning Advisory Committee.	109	93.1	3.2	0.5
4-H members in my parish are willing to participate in a planning process to select Community Service-learning activities.	100	85.5	3.0	0.6
4-H members in my parish are capable of identifying potential groups to partner in efforts for Community Service-learning activities.	95	81.2	2.9	0.6
4-H members in my parish are capable of developing objectives for a Community Service-learning activity.	93	79.5	2.9	0.6
4-H members in my parish are excited by the opportunity to give input when selecting and planning Community Service-learning activities.	89	76.1	2.9	0.6
4-H members in my parish are capable of developing a method of reflection for a Community Service-learning activity.	88	75.2	2.8	0.5
4-H members in my parish are capable of assessing and identifying resources available to conduct a Community Service-learning activity.	86	73.5	2.8	0.6
4-H members in my parish are capable of conducting a needs assessment within a community to identify needs for Community Service-learning activities.	73	62.4	2.6	0.7
4-H members in my parish are self-motivated enough to initiate and conduct Community Service-learning activities.	70	59.8	2.6	0.7
4-H members in my parish should be allowed unlimited input into planning Community Service-learning activities.	69	59.0	2.7	0.8
Grand Mean			2.9	0.4

ERIC

Table 3
Extension 4-H Agents' Assessments of Training Needs for Coordinating Community Service-Learning Activities

Statement from Survey Instrument	Agreed or strongly agreed			
	f	%	M	SD
I believe that 4-H Agent training will improve the quality of Community Service-learning activities in 4-H.	101	86.3	3.2	0.7
I am interested in additional training on how to develop and implement Community Service-learning activities.	84	71.8	2.9	0.8
I believe I am knowledgeable enough to coordinate a planning process for a Community Service-learning activity.	84	71.8	2.8	0.7
I believe I am adequately trained to conduct Community Service-learning activities.	82	70.1	2.8	0.7
I believe I am adequately trained to Coordinate Community Service-learning activities.	78	66.7	2.8	0.7
I believe I am knowledgeable enough to coordinate a needs assessment for Community Service-learning activities.	71	60.7	2.7	0.7
I believe I am adequately trained to involve and train volunteers to conduct Community Service-learning activities.	62	52.9	2.5	0.8
I am familiar with recent research on the impact of Community Service-learning activities.	42	35.9	2.3	0.8
Grand Mean			2.7	0.5

Research question six was designed to describe the respondents based on age, years of experience with Louisiana Cooperative Extension Service, undergraduate major, and whether or not any formal training in the area of community service-learning had been received. The age of the respondents ranged from 22 to 60 with a mean of 39.0 years (SD=13.9). Years of experience ranged from one year to 31 years with a mean of 10.0 years (SD=8.1).

The majority of respondents indicated their undergraduate major was Animal Science. This group included 32, or 27.4%, of the respondents. The other most frequently reported undergraduate majors were Vocational Home Economics Education, which had 27 responses (23.1%), and Home Economics with 21 responses (17.9%). In the "Other" category, undergraduate majors included Elementary Education, Family Services, Biology, Environmental Science, Consumer Affairs, Science Education, and Business Management.

The respondents were also asked to indicate whether or not any formal training in the area of community service-learning had been received. Only 15, or 12.8%, indicated they had received some type of formal training in the area of community service-learning.

The seventh research question attempted to describe what relationship existed between the respondents' perceptions of the value of community service-learning and selected demographic characteristics. Spearman and Pearson correlation coefficients were used to describe any existing

ERIC

relationships between the demographic characteristics and the perception of the value toward community service-learning. The interpretation of the correlation coefficients was based on the set of descriptors by Davis (1971): .01 to .09 –negligible association; .10 to .29 – low association; .30 to .49 – moderate association; .50 to .69 –substantial association; and .70 or higher – very strong association. Since this was a population census, statistical tests were not used.

No practically significant correlation was found between the perceived value of community service-learning and age or amount of formal training. There was a low association between the perceived value and the years of experience, indicating that as the years of experience increased, the agents' perceptions of community service-learning's value decreased.

CONCLUSIONS/RECOMMENDATIONS/IMPLICATIONS

A substantial drop in the number of participants occurred between the elementary and high school level. The researcher concluded that drop in number of participants was indicative of the decrease in 4-H membership at the high school level. Perhaps, however, there may be an increase in the percentage of those 4-H members participating in community service-learning at the high school level from the elementary level. It is recommended that a study using 4-H volunteer leaders as the target population be done to get a better assessment of the actual ongoing activities and factors related to 4-H member participation.

A large percentage of 4-H club members are involved in some type of service activities. Furthermore, more specific detail and information about service-learning activities should be compiled from volunteer leaders, since most of these activities are occurring at the local club level. While more studies are being done on community service-learning, there is still much that can be gained from further studies dealing specifically with 4-H. The extension 4-H agents are presently coordinating an entire parish program and perhaps are not as aware of community service-learning activities on the individual club level as previously thought by the researcher. Presently, there are materials available from the Louisiana Cooperative Extension Service office which describe in detail community service-learning and the necessary criteria for such activities Extension 4-H agents, especially those recently employed, need to be made aware of, or reminded, that these materials are available for use in planning community service-learning programs.

The 4-H agents perceived the value of community service-learning to the participant to be substantial. The respondents indicated a strong belief that these activities contribute to an increased involvement and understanding of their community by the 4-H members and that community service-learning is a valuable tool for 4-H. Extension agents believe that involvement in community service-learning activities reduces the participants' chances of at-risk behavior. It is recommended that this information be used to promote service-learning in 4-H. The information from this study shows strong support for these activities.

While some steps of the planning process for community service-learning are being utilized, the entire process is rarely conducted. 4-H clubs are doing a substantial job partnering with outside agencies and/or organizations. Advisory committees are not being utilized as much as they should be. A general recommendation is that field staff with responsibility in 4-H Youth Development be made aware of, or reminded, of materials developed by the state 4-H staff which provide detailed information on the planning process. It is also recommended that agents should

use their advisory committees more. In particular, the committee should be used to identify community needs through a needs assessment and should be used to select community service-learning activities.

Extension 4-H agents feel that 4-H members should be more involved with selecting and planning community service-learning activities, including identifying partners, needs assessment, and developing objectives. It is recommended that extension 4-H agents be encouraged to get more youth involved in needs assessment, partnering, and other entities of the planning process. From this cluster of items, the study indicated that extension 4-H agents have confidence in the 4-H members' abilities to participate in the planning and implementing process. A study of the volunteer leaders' perceptions of this capability would be necessary to further develop extensive community service-learning.

Agents generally feel confident enough to conduct and coordinate community service-learning activities, despite the fact that a large majority would be interested in training. Their confidence in training leaders, however, was lower. Optional training should be made available to 4-H agents. It is also recommended that this training provide easy-to-use materials for the agents to utilize. In particular, the training should address how agents should train and coordinate volunteer leaders to become active in the area of community service-learning. Detailed information and resources should be provided to 4-H agents.

A majority of the extension 4-H agents in this study cover a variety of undergraduate majors, are young adults with little to moderate experience, and have no formal training in community service-learning. Given the large number of new extension agents that have been hired recently, special attention should be given to those who have not received any community service-learning materials from the state 4-H office. In particular, agents should be provided materials to use in recruiting and training volunteers to work with community service-learning activities.

No relationship exists between the agents' perceptions of community-service learning, and age, experience, or community service-learning training. Although no recommendations are warranted based on this conclusion, it is recommended that optional training be made available for extension 4-H agents who wish to expand on their parish community service-learning activities.

ERIC

REFERENCES

Benson, P.L. (1993). The Troubled Journey: A Portrait of 6th-12th Grade Youth, Minneapolis: The Search Institute.

Conrad D. & D. Hedin (1986). National Assessment of Experiential Education: Summary and Implications, Experiential Education and the Schools. Ed. R. Craft & J. Kielsmeire, Boulder, CO: Association for Experiential Education.

Follman, J. (1996, October). Florida Learn & Serve: 1994-95 Outcome data. Paper presented at the meeting of the National Society for Experiential Education Conference.

Goodlad, S. (1988, February). "Where Might this Take us?" presentation to the Annual Conference of the Partnership for Service-Learning, "Service and Learning: Mapping the Intersections."

Harrison, C. (1987). Student Service: The new Carnegie unit. Princeton: Carnegie Foundation for the Advancement of Teaching.

Israel, G.D. & T.W. Ilvento. (1995). "Everybody Wins: Involving Youth in Community Needs Assessment." Journal of Extension, 33 (2).

Kendall, J.C. & Associates. (1990). Combining Service and Learning: A Resource Book for Community and Public Service, Volume I, Raleigh, N.C.: National Society for Internships & Experiential Education.

Perkins, D.F. & J. Miller. (1994, Fall). "Why Community Service and Service-Learning? Providing Rationale and Research" Democracy & Education, 11-15.

Shumer, R. (1987) "Community Service: A Bridge to Learning." Community Education Journal, 5,(1), 15-17.

Stanton, T.K. (1987). "Liberal Arts, Experiential Learning and Public Service : Necessary Ingredients for Socially Responsible Undergraduate Education," paper presented at 16th Annual Conference of the National Society for Internships and Experiential Education.

Taylor-Powell, E. (1997). Community Service: What 4-H youth groups do to make a difference. Wisconsin Cooperative Extension Service.

ERIC Full Text Provided by ERIC

STATUS OF COMMUNITY SERVICE-LEARNING IN 4-H PROGRAMS

A Critique

Paul R. Vaughn
Texas Tech University

In this study, the authors do an excellent job in clearly stating the purpose and objectives. They also present a good case for the need of identifying if 4-H extension agents are utilizing a planned, experiential approach to community service-learning.

The researchers also did an excellent job in identifying the target population and selecting individuals for the study (all from the target population were surveyed). Field testing of the survey instrument was conducted, and the reported measures of internal consistency were very high. The data collection and follow-up procedures were obviously well done, as an extremely high response rate (over 95%) was obtained.

The following are questions that arose after reading the conclusions and recommendations section.

- Since the study was restricted to Louisiana, should this be highlighted in the conclusions/ recommendations section? Should it also be included in the title? This would eliminate any misunderstanding on the part of a reader who only looked at the conclusions/recommendations section.
- Although there was a high response rate, the authors indicated that thirty of the respondents did not complete one section of the questionnaire. This means that only 87 out of the target population of 123 (70%) provided all the information necessary for the study. Have you conducted a census when 30% of the people have not responded? Is it appropriate to continue to refer to the study as a census—especially for the purpose of analysis? Should this also be reflected in the conclusions?
- Are all the conclusions supported by data from this study? The authors seem ready to conclude that a drop in the number of participants in community service learning activities was a result of a decrease in 4-H membership at the high school level. They also note that there may be an increase in the percentage of those 4-H members participating in community service-learning activities at the high school level from the elementary level. However, there is no data shown to support this conclusion. Is it possible that the reverse may be true?

Was an important finding ignored? The authors utilize an expert's opinion to determine if the strength of a relationship had any practical significance. Using the expert's method of classification, they found that one relationship was more than negligible—yet it was dismissed in terms of significance. The relationship, although low, seems very important—older agents were less supportive of community service-learning activities than younger agents. I believe this is a finding that deserves further attention and study.

The strong support of the study by extension leaders in the state obviously helped with the rate of return. Did it also influence the positive ratings by the agents? We tend to be supportive of things that are deemed important to the people who do our evaluations.

NAERC '99
Research Fresh from Florida

Teams in Agricultural Education: An Assessment of Team Process Instruction

Richard Cummins
Management Analyst, City of Fort Worth

Christine Townsend
Texas A&M University

INTRODUCTION AND THEORETICAL FRAMEWORK

Agricultural educators have long recognized the need for teams in student leadership preparation. This dedication is found within the Agricultural Education profession's student leadership organization – the FFA. The FFA is devoted to "making positive difference in the lives of young people by developing their potential for premier leadership..." (National FFA, 1996). Team work appears as a critical factor of the FFA's leadership philosophy as the organization's mission statement includes this emphasis: "(to develop) interpersonal skills in teamwork, communications, human relations, and social interaction." (National FFA, 1996).

In the world outside of the FFA, teams are also recognized for their benefits of increasing organizational performance. Fisher (1993) listed a number of team successes reported in the popular press at companies including Procter and Gamble, Federal Express, and AT&T. Lowered costs, improved productivity and quality, reduced processing time, and declines in absenteeism are all attributed to self-directed teams. Heuristic evidence from college students seeking jobs indicates that "teamwork" is a skill commonly sought by corporate recruiters.

ERIC

However, Taylor (1998) found that past leadership experience (typically in high school and collegiate organizations) did not influence the ability to work in groups, and recommended that youth leadership organizations increase efforts to develop team skills among members. Swezey and Salas found that "although considerable literature addresses the topic of team training, recent reviews have noted the scarcity of behavioral guidance that may be used to develop and model team-training programs and devices in applied situations" (1993, p. 219).

TEAM DEVELOPMENT FACTORS

Numerous authors have described the characteristics of successful teams. Larson and Lafasto offered the following definition of a team: "a team has two or more people; it has a specific performance objective or recognizable goal to be attained; and coordination of activity among the members of the team is required for the attainment of the team goal or objective" (1989, p. 19). They identify eight characteristics common to successful teams. These characteristics are: clear goals; role definitions and structures that enhance success; competent membership; commitment of all members; a climate of collaboration; high work standards; support and recognition from the organization; and principled leadership (Larson and Lafasto, 1989, p. 26).

Successful teams have also been described in terms of the behaviors performed by members. These behaviors are broken into two general groups: task-oriented behaviors, and maintenance-oriented behaviors. Task-oriented behaviors relate to the work of the group. "Their purpose is to facilitate and coordinate group effort in the selection and definition of a common problem and in the solution of that problem" (Benne and Sheats, 1948, p. 42). Maintenance-oriented behaviors "are designed to alter or maintain the group way of working, to strengthen, regulate, and perpetuate the group as a group" (Benne and Sheats, 1948, p. 42).

Group task behaviors described by Benne and Sheats (1948) deal largely with information-sharing. These include proposing new ideas or goals; seeking information or opinions from other group members; providing information or opinions to other group members; elaborating on the ideas of others; coordinating, or linking together ideas proposed by other group members; orienting, or restating and summarizing the positions taken by group members or questioning the direction of the group discussion; acting as an evaluator or critic of the group's work; energizing the group; acting as the "procedural technician" (Benne and Sheats, 1948, p. 44) by arranging facilities and other routine tasks; and recording group discussions.

Group maintenance described by Benne and Sheats include encouraging other group members; mediating differences among members; seeking to reach compromise with other members; encouraging contributions from reticent group members or limiting discussion on other subjects; evaluating the quality of group processes; observing and recording group processes; or simply listening actively to discussion.

Benne and Sheats recommend training group members in using these task- and maintenance-oriented behaviors. Hackman (1990) alludes to the importance of training team members to work together. Dyer lists seven topics for team training: "1) setting goals; 2) solving problems; 3) making decisions; 4) insuring [sic] follow through and completion of tasks; 5) developing collaboration of effort; 6) establishing lines of open communication; and 7) insuring [sic] an appropriate support system" (1977, p. 73).

Swezey and Salas (1992) list nine important areas team training should address. The first point is mission and goal setting. Next, trainers should create an environment that is similar to the work setting. Third, team members should be made aware of interdependent relationships among their tasks. Fourth, training should help members understand that each plays a role in the success or failure of the team. Fifth, skill-based leadership training should be included; such training "should reflect those critical skills and behaviors appropriate for the team's task requirements" (Swezey and Salas, 1992, p. 231). Next, training should create clear structures for sharing information and reporting progress among members. The seventh area of concern in team training is adaptability and the ability to solve new and different problems. Eighth, training should focus on the specific task skills that team members need to accomplish their tasks. Finally, practice tasks that require substantial interdependence should be used to help develop cooperation among members.

Swezey and Salas also offer general guidelines for team training. First, "teams should be trained as entire units" (Swezey and Salas, 1992, p. 238). Next, "curriculum material should be presented beginning with the simple and moving to the complex" (Swezey and Salas, 1992, p. 239). Finally, "instructors should be able to identify: (a) the critical behaviors that comprise team effectiveness, and (b) examples of these behaviors in real life scenarios" (Swezey and Salas, 1992, p. 239).

SELF-EFFICACY AND TEAM SKILLS

An additional theoretical framework for developing team skills rises from self-efficacy research. Self-efficacy is defined as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391). Maddux noted that "the term is most useful when defined, operationalized, and measured specific to a behavior or set of behaviors in a specific context" (1995, p. 8). In other words, self-efficacy is an individual's belief that he can complete a specific activity successfully.

Self-efficacy is influenced by a number of factors. First--and most important--feelings of self-efficacy are produced through successful practice; feelings of self-efficacy for a given task are strongly impacted by negative performance as well. Vicarious experience, or observing others successfully performing the task, also has some impact on self-efficacy. However, this impact is limited by the observers' perceptions of similarity between the models and themselves. Imaginable experiences and visualization can have a limited impact on self-efficacy. Verbal persuasion has the least impact on self-efficacy among these sources.

Self-efficacy theory indicates that students' teamwork skills will be built—or eroded—to the extent that their teams are successful. It also suggests that, in addition to group assignments, developing teamwork among students requires implementing other measures to ensure successful performance.

PURPOSE FOR THE STUDY

Based on the literature in team development, this study was designed to compare the effectiveness of unassisted team training to assisted team training in an agricultural education seminar preparation class. The specific objectives of this study were to examine differences in agricultural education students':

1) group task-oriented skills after working on a trained or untrained project team.
2) attitudes about group task-oriented values after working on a trained or untrained project team.
3) group maintenance-oriented skills after working on a trained or untrained project team.
4) attitudes about group maintenance-oriented attitudes after working on a trained or untrained project team.

Four null hypotheses were developed:

H_{O1}=There is no difference in task-oriented skills between members of groups that receive training and members of groups that receive no training.

H_{O2}=There is no difference in task-oriented attitudes between members of groups that receive training and members of groups that receive no training.

H_{O3}=There is no difference in maintenance-oriented skills between members of groups that receive training and members of groups that receive no training.

H_{O4}=There is no difference in maintenance-oriented attitudes between members of groups that receive training and members of groups that receive no training.

METHODS AND PROCEDURES

A correlational design was used for this study. The dependent variables were Team Orientation and Behavior Inventory (Goodstein, Cooke, and Goodstein, 1983) scale scores; the independent variable was team training. Although random assignment was not possible, students' selection of their class section was not related to the study; the design was quasi-experimental. The procedure for this study followed the pretest-posttest nonequivalent control group design as described by Gall, Borg, and Gall (1996). Two sections of an agriculture education seminar preparation class were manipulated for the experimental portion of the study. Class activities of the experimental (team training) and control (untrained) groups were kept identical, with the exception that the experimental group was exposed to the treatment. The training lessons of group goal setting, group communication, and cooperation were created from team literature (Larson and Lafasto, 1989; Swezey and Salas, 1992). Both groups were assigned the task of developing and presenting a seminar about an agricultural dilemma. The control group was left alone to work in teams to prepare their seminar. The treatment group received three team training lessons prior to and during their seminar preparation. An alpha level of .05 was set a priori.

The population for this study was agricultural education collegiate students. Participants in two sections of a seminar preparation class conducted by an agricultural education department, comprised the sample for this study. Therefore, the results of this study may be generalized to collegiate agricultural education students enrolled in a seminar preparation class. Of 64 students enrolled in the course, 54 responded to both the pretest and the posttest; therefore, the response

rate for this study was 84%. The response rate was not remarkable as it was due to typical student class attendance and absences.

The instrument used to assess students' self-perceived teamwork skills and attitudes was the Team Orientation and Behavior Inventory (TOBI) created by Goodstein, Cooke, and Goodstein (1983). The TOBI contains 56 statements describing teamwork skills and attitudes. These statements correspond to four internal scales for analysis. The scales are 1) task-oriented skills; 2) task-oriented values; 3) maintenance-oriented skills; and 4) maintenance-oriented values. For the current study, reliability coefficients for the four scales were: task-oriented skills, .8488; task-oriented values, .6561; maintenance-oriented skills, .8328; maintenance-oriented values, .6783. See Table 1.

Responses were based on a seven point Likert-type scale of: A=strongly disagree (very unlike me); B=disagree (unlike me); C=slightly disagree (somewhat unlike me); D=neither agree nor disagree (neither like nor unlike me); E=slightly unlike me (somewhat like me); F=agree (like me); and G=strongly agree (very like me). The responses were coded as A=1, B=2, C=3, D=4, E=5, F=6, and G=7. A higher numeric value for a particular statement indicated a stronger agreement or self-perception of the skill or value.

Table 1.

Cronbach's Coefficient Alpha for Task and Maintenance Skills and Values

Scale	alpha
task skills	0.8488
task values	0.6561
maintenance skills	0.8328
maintenance values	0.6783

RESULTS AND FINDINGS

Prior to Training: Team Trained vs. Untrained

A t-test for independent means was used to test treatment and control groups for differences prior to team training. The means for all four TOBI scales were used. There were no significant differences between groups prior to the course on any scale, as shown in Table 2. Students in the treatment and control groups showed the same self-perceptions of their abilities to perform task and maintenance functions in a group, and the same values toward those functions.

After Training: Team Trained vs. Untrained

A t-test for independent means was used to compare means of all four scales of the TOBI. The results of the analyses are represented in Table 3. There were no statistically significant differences between groups after training. Students in the trained and untrained groups had the same self-perceptions of their ability to perform task and maintenance functions in a group. Similarly, all students had the same perceptions of their values of those functions

ERIC

Prior to and Following Training: Team Trained Group

A t-test for independent means was used to compare means of all four TOBI measurement scales for the trained group before and after training. The results of the analyses are represented in Table 4. There were no statistically significant differences in group-task values or group maintenance values as a result of training. However, there was a significant increase in maintenance-oriented skills, with a two-tailed significance of .039, and a significant increase in task-oriented skills, with a two-tailed significance of .006.

Table 2.
Differences in Self-Perceived Team Skills and Values Prior to Training (alpha=.05)

Team Skills	N	Mean[1]	SD	2-Tail Prob
task-oriented skills				
team trained	27	68.74	9.48	0.170
untrained	25	72.04	7.37	
task-oriented values				
team trained	27	72.37	7.09	0.566
untrained	25	73.60	8.24	
maintenance-oriented skills				
team trained	27	71.74	9.75	0.408
untrained	25	74.00	9.76	
maintenance-oriented values				
team trained	27	78.56	7.05	0.396
untrained	25	80.24	7.13	

Note: [1]Adjusted for missing cases. Maximum possible score for one scale=98. Minimum possible score for one scale=14.

ERIC

Table 3.
Differences in Self-Perceived Team Skills and Values After Training (alpha=.05)

Team Skills	n	Mean[1]	SD	2-Tail Prob
task-oriented skills				
team trained	27	76.22	9.59	0.432
untrained	27	73.96	11.28	
task-oriented values				
team trained	27	74.37	8.94	0.267
untrained	27	71.74	8.28	
maintenance-oriented skills				
team trained	27	77.33	9.64	0.509
untrained	27	75.67	8.76	
maintenance-oriented values				
team trained	27	79.81	8.88	0.442
untrained	27	77.96	8.71	

Note: [1]Adjusted for missing cases. Maximum possible score for one scale=98. Minimum possible score for one scale=14.

Table 4.
Received Team Training: Differences in Self-Perceived Team Skills and Values Before and After Training (alpha=.05)

Team Skills	n	Mean[1]	SD	2-Tail Prob
task-oriented skills				
score prior to training	27	68.74	9.48	0.006
score after training	27	76.22	9.59	
task-oriented values				
score prior to training	27	72.37	7.09	0.367
score after training	27	72.37	8.94	
maintenance-oriented skills				
score prior to training	27	71.74	9.75	0.039
score after training	27	77.33	9.64	
maintenance-oriented values				
score prior to training	27	78.56	7.05	0.566
score after training	27	79.81	8.88	

Note: [1]Adjusted for missing cases. Maximum possible score for one scale=98. Minimum possible score for one scale=14.

Table 5.
No Team Training: Differences in Self-Perceived Team Skills and Values Before and After Training (alpha=.05)

Scale	n	Mean[1]	SD	2-Tail Prob
task-oriented skills				
score prior to training	25	72.04	7.37	0.474
score after training	27	73.96	11.28	
task-oriented values				
score prior to training	25	73.60	8.24	0.421
score after training	27	71.74	8.28	
maintenance-oriented skills				
score prior to training	25	74.00	9.76	0.519
score after training	27	75.67	8.76	
maintenance-oriented values				
score prior to training	25	80.24	7.13	0.309
score after training	27	77.96	8.71	

Note: [1]Adjusted for missing cases. Maximum possible score for one scale=98. Minimum possible score for one scale=14.

Prior to and Following Training: Untrained Group

A t-test for independent means was used to compare means of all four TOBI scales for the control group before and after training. The results of the analyses are represented in Table 5. There were no significant differences on any scale after training.

CONCLUSIONS AND RECOMMENDATIONS

There was a statistically significant increase in the team trained group's score on the TOBI scale for task-related skills. This result indicated that task-related skills could be taught to students. However, there was no significant difference between after training scores for the team trained and untrained groups on the TOBI scale for task-related skills. Therefore, the null hypothesis$_{01}$ was not rejected. These results were inconsistent with each other. Therefore, it was unclear whether or not team training impacts task-oriented skills; this finding may be a result of the low intensity of the team training treatment (3 one-hour lessons, distributed over seven weeks). The self-efficacy research of Bandura (1977, 1986), Maddux (1995), and Williams (1995) adds credibility to the inconsistency of these findings. Experience is the most important component in developing self-efficacy, while verbal persuasion plays only a minor role. In this study, the groups had similar experiences, completing group projects under the same circumstances; this similarity produced after-training scores that were not significantly different for task-oriented skills. However, the treatment group had the added benefit of lessons on successful teamwork; this training forced teams to be together and may have been an effect that resulted in a significant difference in pretest and score after training scores for the treatment group. Phillips and Santoro (1989) found that students responded favorably to team training

using computer-mediated communication. The change in task-oriented skills for the treatment group supported this finding.

There was no significant change in the mean score for the team trained group on the TOBI scale for task-related values, nor was there a significant score after training between the trained and untrained groups for this scale. Therefore, the null hypothesis was not rejected based on the evidence obtained. Team training and teamwork in collegiate classes do not impact students' attitudes about task-oriented behaviors; this finding echoed the studies of R. Cummins (1995) and Taylor (1998). Continuing studies in agricultural leadership education have indicated that attitudes were difficult to change in short-term training venues.

There was a statistically significant increase in the team trained group's scores on the TOBI scale for maintenance-related skills; however, there was no significant difference in after-training means for this scale between trained and untrained groups. This result was similar to the result for task-related skills; members of the treatment group did improve their maintenance-oriented skills. The low intensity of the treatment (only three team lessons) may be a factor in the lack of significant difference between trained and untrained groups after training. This result supports the findings of self-efficacy research (Bandura, 1977, 1986; Maddux, 1995; Williams, 1995). The groups had scores for maintenance-oriented skills that were not significantly different after similar experiences, while the addition of verbal persuasion did lead to a significant change in the maintenance-oriented skills in the team trained group.

There was no statistically significant difference for the TOBI scale for maintenance-related values for the team trained group, and there was no significant difference in after-training means for the trained or untrained. Therefore, the null hypothesis was not rejected based on the evidence obtained. There was no change in students' attitudes toward maintenance-oriented behavior as a result of training, a finding similar to those of R. Cummins (1995) and Taylor (1998). Attitudes about leadership do not change during a short-term team training program.

Recommendations for Additional Research

The completion of this study raised many more new questions than it answered. Topics for additional research are:

1. A repetition of the present study is needed with a larger sample to clarify the impact of training on task-oriented skills and maintenance-oriented skills.
2. The present study was limited by constraints of the course to three lessons; future studies should involve a more intensive treatment. This treatment should incorporate simulations of teamwork skills and observations of successful teams in action as well as the lecture and project format used for the present study.
3. The population of the present study was limited to senior students in a major requiring a great deal of group projects. Further study is recommended with students less experienced in working with groups; selection of other majors that do not require much group work may contain students who value task and maintenance skills at a lower level than Agricultural Education majors.
4. Although values appeared to not change in this short-term training, further research is needed to determine the effect of longer training programs on values.

5. Further research should be conducted to evaluate output quality as a result of team training.
6. Further research should be conducted to evaluate course content and design for team training.

Programmatic Recommendations

1. Although the population for this study was collegiate Agricultural Education students, due to historical matriculation from high school agriculture programs to collegiate agricultural education programs, there may be some transferability of the findings of this study to the FFA. Therefore, the FFA could evaluate, with caution, their team components and assess the effect of teamwork on participants' future team attitudes.
2. As team process training did appear to have an impact on collegiate Agricultural Education student teaming skills, student leadership organizations, such as the FFA, should consider, with caution, the development of team process training modules to be utilized prior to teaming activities.
3. Based on the use of teams in many collegiate curricula, Agricultural Education Departments should explore providing explicit teamwork training in the classroom. Most students should not be expected to have an innate understanding of teamwork, nor should students be expected to "pick up" teamwork as a result of group assignments.
4. Team training should be provided early in students' education in order to facilitate later group assignments and help students fully develop team skills.

ERIC

REFERENCES

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. Psychological Review, 84(2), 191-215.

Bandura, A. (1986). Social foundations of thought and action: a social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall.

Benne, K., and Sheats, P. (1948). Functional roles of group members. Journal of Social Issues, 4(2), 41-49.

Cummins, R.L. (1995). An assessment of attitudes toward leadership by participants of selected leadership labs at Texas A&M University. Unpublished doctoral dissertation, Texas A&M University, College Station.

Dyer, W.G. (1977). Team building: issues and alternatives. Menlo Park, CA: Addison-Wesley.

Fisher, K. (1993). Leading self-directed work teams. New York: McGraw-Hill.

Gall, M.D., Borg, W.R., and Gall, J.P. (1996). Educational research: an introduction. White Plains, NY: Longman.

Goodstein, L.D., Cooke, P., and Goodstein, J. (1983). The team orientation and behavior inventory (TOBI). In Goodstien, L.D., and Pfeiffer, J.W. (Eds.). The 1983 Annual for Facilitators, Trainers, and Consultants (pp. TOBI 1-TOBI 12). San Diego: University Associates.

Hackman, J. R. (1990). Groups that work (and those that don't): creating conditions for effective teamwork. San Francisco: Jossey-Bass.

Larson, C.E., and Lafasto, F.M. (1989). Teamwork: what must go right/what can go wrong. London: Sage Publications.

Maddux, J. (1995). Self-efficacy theory: an introduction. In Maddux, J. (Ed.) Self-Efficacy, Adaptation, and Adjustment (pp. 3-36). New York: Plenum Press.

National FFA. (1996). FFA Mission. [online]. Available: *http://www.agriculture.com/contents/FFA/aboutffa/geninfo.html*, (1999).

Phillips, G.M., and Santoro, G.M. (1989). Teaching group discussion via computer-mediated communication. Communication Education, 38, 151-161.

Swezey, R.W., and Salas, E. (1993). Guidelines for use in team-training development. In Swezey, R.W., and Salas, E. (Eds.). Teams: their training and performance (pp. 219-245). Norwood, NJ: Ablex Publishing.

Taylor, J-J. E. (1998). Leadership skills and attitudes perceived by collegiate male students. Unpublished doctoral dissertation, Texas A&M University, College Station.

Williams, L.S. (1995). Self-efficacy and anxiety and phobic disorders. In Maddux, James (Ed.) Self-efficacy, adaptation, and adjustment (pp. 69-108). New York: Plenum Press.

TEAMS IN AGRICULTURAL EDUCATION: AN ASSESSMENT OF TEAM PROCESS INSTRUCTION

A Critique

Paul R. Vaughn
Texas Tech University

The authors do an excellent job in developing the rationale for the study, and the purpose of the study was clearly stated. Although I prefer studies that develop research (directional) hypotheses instead of null (non-directional) hypotheses, the null hypotheses were correctly stated and well written.

The standardized instrument used by the researchers appears to be one that is both valid and reliable. The authors do an excellent job in describing the instrument and reporting measures of internal consistency.

I also commend the authors for applying their research to a real life situation, rather than forcing students into an artificial setting. Although this means giving up some internal validity, it greatly enhances the external validity of the study. The addition of a pre-test along with a pre-treatment comparison strengthened the internal validity of the study and was a positive feature of the research. The authors are also to be commended for adding words of caution to some of their conclusions and recommendations.

The following questions arose from a review of the study:

- What was the actual design for the study? The authors report it as being both a "correlational" design, and a "quasi-experimental" design. They also indicated that two sections were "manipulated for the experimental portion of the study." "Manipulation" normally means random assignment which implies this was a true experiment. The authors go on to say that "random assignment was not possible," and that students evidently self-selected their section. I found all this to be confusing. Being unable to randomly assign students to different treatment groups eliminates the possibility of the study being an experiment. Thus, the study was either a quasi-experiment or a correlational design. In order to be a quasi-experiment, the treatment would have to be randomly assigned to one of the intact groups. It is unclear as to whether this took place or not—the assumption is that it did not take place. If so, the first design reported by the authors (correlational) is the correct design for this study.

- Is there a more appropriate analysis for the study? Since a pretest was given, it would have been possible for the researchers to use the t-test for correlated means instead of the t-test for independent means. The t-test for correlated means results in a smaller standard error than the t-test for independent means. It also increases the chances of detecting a significant difference.

ERIC

- Is differential mortality an issue in this study? The authors refer to a "response rate" which indicated that 16% of the students did not complete the pretest and posttest. This is not an issue UNLESS most of the "non-completers" were from one group. This "differential mortality" could account for differences found (and not found) by the researchers. There was no information provided that allows us to rule out this possibility.

In light of the questions about the design, are the conclusions and recommendations justifiable?

NAERC '99
Fresh from Florida

Using Multivariate Analysis Techniques to Identify Factors Influencing FFA Membership in High School Agricultural Education Programs

Joseph Gliem
The Ohio State University

Rosemary Gliem
The Ohio State University

INTRODUCTION

The National FFA Organization is concerned with the growth of its membership. In August 1996, the National FFA Organization set a recruitment goal in their teachers' newsletter, "FFA Advisors Making a Difference." The goal was to increase the national FFA membership roster by 66 percent - up to 750,000 members nationwide, compared to just over 451,000 today - and accomplish it by 2002. They believed the goal was possible when one considers that less than 60 percent of current agricultural education students are dues paying FFA members.

In 1995, the National FFA Organization estimated there were approximately 600,000 secondary agricultural education students, of which, 440,000 joined the FFA. The remaining 160,000 were not members of the FFA. From the 1993 State Annual Reports supplied to the National FFA Organization, membership as a percent of enrollment in agricultural education in the four regions were as follows: Central (81.0%), Eastern (68.7%), Western (74.8%), and Southern (62.7%).

ERIC

Membership in the organization has been growing for the past several years; however, it has declined over the last three years and information was not available to explain why all agricultural education students were not joining the FFA. The decision to join the FFA was a voluntary decision that was made by students. Therefore it appeared there was a need to identify factors, which were involved in this decision.

THEORETICAL FRAMEWORK

Agriculture students are faced with many choices during their years in high school, such as the decision to join the FFA. The decision to join is complex and requires an in-depth analysis of the various factors involved in this process. High school students are influenced by many different factors. The review of the literature explored the reasons for both participation and non-participation in youth organizations.

Reasons for Joining Student and Youth Organizations

Marshall, Herring, and Briers (1990) surveyed 2,380 agricultural science students from 35 schools in Texas to determine their reasons for enrollment in the class, reasons for joining or not joining the FFA, and the relationships between students' characteristics and their reasons for enrolling. They found that students enrolled in agricultural science classes in Texas because of the class characteristics (i.e., the students' perceptions of what they would be doing in class). They also discovered that students enrolled in agricultural science classes because it enhanced their personal identity that was further described as those things that had a positive effect on the adolescents' development task.

Connors, Moore, and Elliot (1990) surveyed 441 non-FFA member agricultural education students from 45 high schools' agriculture programs in Michigan. They found that the most important factor influencing students to join the FFA was their level of interest in agriculture.

Cano and Bankston (1992) found that minority students involved in 4-H indicated similar reasons for joining their organization. Results showed that participants felt that the positive influences of 4-H included the experiences, educational activities, and opportunities for personal development.

Migler (1992) studied 48 students in six focus group meetings at three technical colleges in Minnesota to determine factors encouraging membership and types of activities preferred in post-secondary student organizations. Three of the focus groups included students that had graduated from high school within the past three years while students in the other three focus groups were over the age of 27. Students in both age groups ranked the instructors' influence as very important in their decision whether or not to participate in post-secondary organizations.

Morris and Company (1992) conducted 16 focus group interviews throughout the greater metropolitan Washington D.C. area, which included minority youth. They were from "at-risk" environments due to pervasive social and economic problems. They included both youth who participated and did not participate in organized after-school, non-school, community-based youth organizations. The researchers found that the youth participated for personal and social benefits.

Barriers to Membership in Student Organizations

Hoover and Scanlon (1991) identified factors that influenced students' decisions of whether or not to enroll in agricultural education classes and join the FFA. They surveyed 540 11th and 8th graders in 36 schools in 12 states. They found that an overriding barrier to enrollment was the image of agricultural education, the FFA, and the agriculture profession in general. Non-members perceived agricultural education and the FFA as being for males from farms, saw no future value in taking agricultural education courses, and were influenced by significant others not to enroll.

Connors, Moore, and Elliot (1990) examined why agricultural education students did not join the FFA. They surveyed 441 non-FFA member agricultural education students from 45 high school agriculture programs in Michigan. The greatest barrier to joining the FFA, and other agricultural student organizations, was the level of interest in agriculture and the future value of the FFA to their career.

Cooper and Nelson (1983) surveyed vocational agriculture students and teachers in the 15 states of the Eastern FFA Region. They found that the cost of FFA dues was not a barrier to membership. Ninety-four percent of the non-members reported the cost of FFA dues had not kept them from joining.

Hudson (1994) in the final report of the National Assessment of Vocational Education studied to what extent minority students were involved in vocational student organizations and the factors affecting their participation. The researchers surveyed approximately 2,000 high school and post-high school chapter advisors from the 10 vocational student organization categories for opinions. The most frequently stated reasons by the advisors for students not belonging to vocational student organizations, were conflicts with other activities (time) and lack of student interest. Minorities ranked lack of interest higher than lack of time.

PURPOSE AND RESEARCH QUESTION

The purpose of this study was to use data from a previous national study on FFA membership to identify factors influencing FFA membership. The research question for this study was:

1. What factors influence FFA membership?

METHODS/PROCEDURES

The following section presents the procedures used to collect the student information for this descriptive study. The topics included; subject selection, instrument development, and data analysis.

Subject Selection

Questionnaires were sent to a sample of agricultural education programs throughout the United States in October 1995. The National FFA Organization identified those states with the highest percentage of non-members based on enrollment data. The data was based upon FFA membership as a percent of agricultural education enrollment as reported to the National FFA through the 1993 State Annual Report. The states were divided into the four FFA regions (Central, Western, Eastern, and Southern), and the two states having the lowest percentage of FFA

membership in each of the four regions, were selected. Those states and percent of FFA memberships were: Georgia (51.4%), Florida (55.2%), Virginia (39.8%), Wisconsin (69.3%), Washington (37.9%), Idaho (52.6%), Delaware (37.9%), and Michigan (67.7%). The state FFA executive secretary from each state was contacted and asked to nominate one rural (non-metropolitan, □ 20,000 county population) and one urban (metropolitan, >20,000 county population) school with a high percentage of non-members based on agricultural education enrollment data.

Teachers in each of the sixteen selected schools were then contacted and agreed to participate in the study. Questionnaires were sent to these teachers, who then administered them to their students. The data was collected during October and November of 1995.

<u>Description of the Sample</u>

The questionnaire was completed by 634 students. These were the students present on the day that the teachers distributed the student questionnaires. Fifty-three percent of the samples were from metropolitan schools, while 47% were from non-metropolitan schools. The following is the states that participated in the study, with the number of students that responded to the questionnaire, and the percentage related to the total sample: Delaware 145 (23%), Florida 83 (13%), Georgia 49 (8%), Idaho 103 (16%), Michigan 34 (6%), Virginia 76 (12%), Washington 72 (11%), and Wisconsin 72 (11%).

<u>Instrument Development</u>

The questionnaire was developed based upon factors noted in the review of literature and from interviews conducted with a previous national FFA officer, former agricultural education instructors, and teacher educators. A panel of nine experts reviewed the questionnaire for face and content validity. The panel consisted of teacher educators, the Ohio FFA executive secretary, a national FFA officer, high school agriculture instructors, and a 4-H administrator. The questionnaire was field tested and pilot tested in Ohio in September and October 1995. Students' attitudes were assessed by using a four-point Likert scale with responses varying from strongly disagree to strongly agree. Test-retest procedures were utilized during the pilot test to calculate reliability over time, and a 61% agreement on the 32 items that influenced students <u>not to join</u> the FFA was obtained. A 68% agreement was achieved on questions, which asked what would influence them <u>to join</u> the FFA. A 71% agreement was achieved on questions, which asked reasons why they decided <u>to join</u> the FFA. Ex post facto internal consistency reliability was computed using Cronbach's alpha which was .92 for the set of 16 four point Likert questions related to students' agreement or disagreement with statements about their agriculture instructor.

<u>Data Analysis</u>

Completed questionnaires were returned to The Ohio State University for data analysis. The data were analyzed using SPSS 8.0 for Windows. Descriptive statistics were used to describe the sample.

Exploratory factor analysis was used to identify factors underlying agricultural education instructor traits relative to the FFA as perceived by agricultural education students. Factor analysis was used to identify a relatively small number of factors that could be used to represent relationships among sets of many interrelated variables.

In order to determine if the data were appropriate for factor analysis, a correlation matrix of instructor traits was reviewed for inter-correlation's greater than $|0.30|$ and Bartlett's test of sphericity and the Kaiser-Meyer-Olkin measure of sampling adequacy were calculated. Bartlett's test of sphericity resulted in rejecting the hypothesis that the correlation matrix was an identity matrix (Chi-Square 4538.85; df = 120; $p < .001$). The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.93. Based upon the correlation matrix and the statistics generated, it was concluded that the data were appropriate for factor analysis.

Logistic regression was used to predict whether a student would be an FFA member or nonmember. All nominal variables were first dummy coded using indicator coding, and then a stepwise logistic regression model was used to identify significant predictor variables. If a multichotomous predictor variable was determined to be a significant predictor, but none of the levels of the variable were significant, the variable was recoded into a dichotomous predictor variable so as to maximize the variance in the variable. The dependent variable was whether students were FFA members or nonmembers. An alpha level of 0.05 was set *a priori*.

RESULTS/FINDINGS

Students' Gender and Ethnic Background

Of the 632 students, 62% (389) were males, while 38% (243) were female. The students indicated that 81% (505) were White (Caucasian), 8% (52) were African American, 4% (25) were Hispanic, 3% (18) were Native American, 2% (13) were Asian and 2% (14) were other.

Grade Levels and Program Enrollment

Enrollment status of the students during the 1995-96 school year were as follows: two percent of the sample (14) were in the 8th grade, 29% (184) were in the 9th grade, 24% (150) were in the 10th grade, 26% (165) were in the 11th grade, and 19% (121) were in the 12th grade.

Twenty-six percent (159) of the students indicated they were enrolled in an agriscience class, while 20% (122) were in a program they described as "other." Sixteen percent (101) of the students indicated they were enrolled in a production agriculture program, while 16% (99) were enrolled in horticulture.

Fourteen percent (83) indicated they did not know which of the program names best described their program. Eight percent (50) indicated they were in an agricultural business program.

Year of First Enrollment

Students were also asked what year they first enrolled in agricultural education. A total of 57% (348) of the students indicated they enrolled in the 9th grade, 17 % (105) enrolled in the 10th grade, 17% (105) enrolled in the 11th grade, and 6% (37) enrolled in the 12th grade. Only 3% (19) of students indicated they first enrolled in agricultural education during the 8th grade.

Relatives in the FFA

Students were asked to indicate whether they had family members who had been members of the FFA. Forty-eight percent (296) indicated none of their immediate family members had been members of the FFA, 24% (147) indicated they did not know if any of their immediate family members had been members of the FFA, and 28% identified a family member.

Part-Time Work After School

In a separate question, students reported the extent to which they worked part-time after school. Possible responses included: after school job, on-the-farm work, SAEP work, babysitting, volunteer work, and household chores. Sixty-nine percent of the students (434) indicated that they did work part-time after school while 31% (195) indicated that they did not. For those who indicated that they worked part-time, 30% (137) indicated that they worked between 1 - 5 hours per week. Thirty-two percent (143) indicated that they worked between 6 - 15 hours per week, while 24% (108) worked between 16 - 25 hours per week. Fourteen percent (63) indicated that they worked over 25 hours per week.

Students' Level of Interest in Agriculture as a Future Career

Students were asked to indicate their level of interest in agriculture, including off-the-farm agriculture as a future career. Fifty-nine percent of the students had a high to moderate level of interest, while 41% had minimal or no interest in agriculture as a career.

Instructor Traits

To determine the factors underlying agricultural education instructor traits relative to the FFA as perceived by agricultural education students, it was assumed that the variance of each measured variable could be decomposed into common and unique portions. A principal component method of factor extraction was used.

Two criteria were used to determine the number of factors to be extracted. First, only factors with eigenvalues greater than 1.0 were considered in the analysis. Second, a screen plot of the factor eigenvalues was used to identify breaks or discontinuity in determining the number of major factors. The extraction procedure resulted in the identification of two factors underlying agricultural education instructor traits relative to the FFA as perceived by agricultural education students. The two extracted factors were rotated using a varimax rotation method with Kaiser Normalization to aid in the interpretation of the factors. The factors resulting from such a rotation are orthogonal to each other.

The variables (items) in the rotated factor matrix (Table 1) were examined to understand and interpret the nature of the two factors. The factor loadings were sorted from high to low and indicate the correlation between each item and the derived factor. To assist in the interpretation, reduce subjectivity, and reduce the likelihood of nonsignificant items loading on the factors, only items with factor loadings of $|0.40|$ and higher were considered when labeling the two factors. The two factors were labeled as; a) Teacher enthusiasm for the FFA and b) Providing classroom instruction on FFA activities.

The "Teacher enthusiasm for the FFA" factor accounted for 47.6% of the variation in agricultural education instructor traits relative to the FFA as perceived by agricultural education students. The "Providing classroom instruction on FFA activities" factor explained 8.3% of the variation. Together the two factors accounted for 55.9% of the variance. Cronbach's alpha reliabilities, as measures of internal consistency of the two factor subscales, was 0.93 for the "Teacher enthusiasm for the FFA" factor and 0.70 for the "Providing classroom instruction on FFA activities" factor. The lower alpha for the second factor was probably due to the low number of items (5) that were included for this factor.

ERIC Full Text Provided by ERIC

Using the two factor scores and other independent variables, a forward stepwise logistic regression procedure was used to predict whether a student would be an FFA member or nonmember. The likelihood-ratio test was used as the criterion for variable removal from the model. Summary data for the dependent variable (FFA member or non FFA member) and the independent variables (class rank, year first enrolled in FFA, agricultural program enrolled in, interest in agriculture, family members being former FFA members, teacher enthusiasm, and classroom instruction in FFA) are presented in Tables 2 and 3.

Table 1
Rotated Factor Matrix of Sixteen Instructor Traits using Varimax Rotation (n = 611)

Instructor Traits	Teacher Enthusiasm	Classroom Instruction on FFA Activities
Is committed to the FFA	.81	
Is enthusiastic about the FFA	.81	
Promotes FFA to female students	.78	
Promotes future value of the FFA	.74	
Stays after school to work with students on FFA activities	.74	
Promotes FFA in the classroom	.72	
Promotes FFA to minority race students	.70	
Promotes present value of FFA	.70	
Encourages me to join FFA	.70	
Promotes FFA participation	.68	
Values FFA as a leadership tool	.62	
Includes participation in FFA activities as part of the grade		.79
Includes public speaking in class activities		.70
Requires projects as part of the class grade, SAE		.58
Spends time in class on FFA activities	.43	.58
Is so supportive of the FFA, he/she would pay my dues	.40	.43
Eigenvalue	7.61	1.33
Percent Total Variance	47.55	8.33
Percent Trace (Common Variance)	47.55	8.33

160

Table 2
Dependent Variable: FFA Member or Nonmember

Membership Status	Number	Percent
Member	286	46.8
Nonmember	325	53.2
Total	611	100.0

Table 3
Summary Data: Independent Variables (n=625)

	Intercorrelations							
Variables	X1	X2	X3	X4	X5	X6	Mean	S.D.
Class Rank (X1)[a]	1.00	0.54	0.10	0.05	0.06	-0.02	0.71	0.45
Year First Enrolled in FFA (X2)[b]		1.00	-0.01	-0.12	-0.01	-0.10	0.43	0.50
Agricultural Interest (X3)[c]			1.00	0.13	0.17	0.13	0.84	0.37
Family Members in FFA (X4)[d]				1.00	0.05	0.25	0.47	0.50
INSTRUCTOR FACTORS								
Teacher Enthusiasm (X5)					1.00	0.00	0.00	1.00
Classroom Instruction on FFA Activities (X6)						1.00	0.00	1.00

[a]0 = 9th grade; 1 = Other than 9th grade
[b]0 = 9th grade; 1 = Other than 9th grade
[c]0 = No agricultural interest; 1 = Some agricultural interest
[d]0 = No family members in FFA; 1 = Family members in FFA

Table 4 shows a summary of the logistic regression model. The overall model was significant (Chi-square 108.62; df = 6; p <.001) and each of the predictor variables were also significant. The model accounted for approximately 32% (Nagelkerke R-square) of the variance in the dependent variable. The classification table (Table 5) shows the model correctly predicted 74.27% of the FFA members and 70.65% of the non FFA members giving an overall correct classification rate of 72.56%. This was 21.36% better than if all cases were predicted to belong to the nonmember group (largest group with 53.2%).

Table 4
Logistic Regression: Predicting Student Membership in FFA (n=390)

Variables	Logistic Regression Coefficient	Wald Statistic	p	R	Exp(B)[a]
Class Rank	1.162	12.79	<.001	0.14	3.20
Year First Enrolled in FFA	-0.866	9.60	.002	-0.12	0.42
Interest in Agriculture	0.822	5.07	.024	0.08	2.27
Family Members in FFA	1.282	25.31	<.001	0.21	3.60
Teacher Enthusiasm	0.611	21.05	<.001	0.19	1.84
Classroom Instruction in FFA	0.406	10.79	.001	0.13	1.50
(Constant)	-1.592				

[a] Factor by which the odds of being an FFA member increase or decrease for a one-unit increase in the independent variable.

Model Chi-Square = 108.62; df = 6; p = <.001
Nagelkerke R-square = 0.32

Table 5
Classification Table: Predicting FFA member or nonmember

	Predicted		
Observed	Member	Nonmember	Percent Correct
Member	53	153	74.27
Nonmember	130	54	70.65
Overall Percent Correct (Hit Ratio)			72.56

162

CONCLUSIONS/RECOMMENDATIONS

The reader is cautioned about generalizations of the findings from this study beyond the sample due to the exploratory nature of the statistical procedures used in the analysis. Generalizations of the findings should only be made after replication of the study. The data analysis for this study showed six variables (class rank, year first enrolled in FFA, interest in agriculture, former family membership in FFA, teacher enthusiasm for FFA, and including FFA activities as part of classroom instruction) as significant predictors told of whether a student would be an FFA member or nonmember. These six variables accounted for 32% of the variance in student FFA membership status and provided a 73% correct classification rate. A student was more likely to be an FFA member if he/she were not in the 9th grade, had first become a member of the FFA in 9th grade, had some interest in agriculture, had family members who were former FFA members, had a teacher who was enthusiastic about the FFA, and had a teacher who included classroom instruction time on FFA activities.

Teachers should;

a) recruit students into agricultural education as early as possible,
b) encourage membership in the FFA when students first enter agricultural education and all subsequent years students remain in agricultural education,
c) create interest in agriculture through recruitment activities, classroom instruction, FFA leadership opportunities, career opportunities, and involvement of family members,
d) be enthusiastic about the many opportunities available with FFA membership, and
e) include classroom instruction on FFA activities.

ERIC Full Text Provided by ERIC

REFERENCES

Cano, J. & Bankston, J. (1992). Factors which influence participation and non-participation of ethnic minority youth in Ohio 4-H programs. Journal of Agricultural Education, 33 (1), 23-29.

Connors, J., Moore, E. & Elliot, J. (1990). Factors influencing secondary Michigan agricultural students' decisions not to join the FFA. Proceedings of the Seventeenth Annual National Agricultural Education Research Meeting (19-26). Cincinnati, OH.

Cooper, E.L. & Nelson, C.L. (1983). Relationships among FFA membership factors and vo-ag programs in the Eastern FFA region. The AATEA Journal, 24 (2), 10-21.

Hoover, T. S. & Scanlon, D.C. (1991). Enrollment issues in agricultural education programs and FFA membership. Journal of Agricultural Education, 32 (4), 2-10.

Hudson, L. (1994). National assessment of vocational education. Washington, DC: Office of Educational Research and Improvement. (ERIC Document Reproduction Service No. ED 371 194)

Marshall, T.E., Herring, D.R. & Briers, G.E. (1990). Analysis of enrollment in agricultural science and membership in the FFA in Texas. Proceedings of the Seventeenth Annual National Agricultural Education Research Meeting (10-17). Cincinnati, OH.

Migler, J. (1992, December). Perceptions of postsecondary vocational student organizations by recent high school graduates and non-traditional students. Paper presented at the American Vocational Association Convention, St. Louis, MO.

Morris & Company (1992). What young adolescents want and need from out-of-school programs: A focus group report. Washington, DC: Carnegie Council on Adolescent Development. (ERIC Document Reproduction Service No. ED 358 180)

National FFA Organization-- Membership by Year [Electronic Data File]. (1999). Indianapolis, IN: National FFA Organization [Producer and Distributor].

National FFA Organization (1996, August). 750,000 FFA Members by 2002. FFA Advisors Making A Difference, 5 (1), 1.

ERIC

Using Multivariate Analysis Techniques To Identify Factors Influencing FFA Membership in High School Agricultural Education Programs

A Critique

Paul R. Vaughn
Texas Tech University

The authors do an excellent job in reviewing the research and literature regarding reasons for joining (and not joining) student and youth organizations. One of the nice aspects of the review is the clear, succinct manner in which it is written. This left ample space for the researchers to describe their procedures and results. It is an example that many of in the profession need to emulate.

When I first read the title of the study, I was critical of it—I don't think it is appropriate to put the statistical technique used in the title. However, after reading the paper, it is obvious that the major purpose of the study was to analyze previously collected data using a variety of multivariate techniques. As such, the addition of the statistical technique in the title is not only appropriate, it is necessary.

The authors do an excellent job in describing how the study was designed. The rationale for subject selection and was clearly explained. The procedures used for subject selection were also appropriate.

The authors are to be commended for using multiple measures of reliability for their instrument. One measure was a test of internal consistency; the other was a test of stability. This is highly recommended, as both measures are important issues. The use of a panel of experts to review the instrument for face and content validity is another positive of the research.

The heart of this study was the statistical procedures used to analyze the data. The authors do a superb job in explaining both the techniques and the results. The findings are clearly stated, and the conclusions/recommendations are well written. Another note of commendation for the authors is the caution they place on the findings—they alert the reader to be cautious about generalizing the findings beyond the sample due to the exploratory nature of the statistical procedures used in the analysis. Again, I think this is something we need to do more often within the profession.

I find it difficult to suggest changes in the study. I think it is an excellent study with important findings for the profession, both in terms of the results and the techniques used to produce the results. The only improvement I could suggest would be an increase in sample size or a replication of the study. This would enhance the external validity of the results.

NAERC '99
Research Fresh from Florida

Economic Impact of Supervised Agricultural Experience Programs In Georgia

David West
Crisp County High School

Maynard Iverson
The University of Georgia

INTRODUCTION

Agricultural Education programs have long been a part of the State of Georgia. Wheeler (1948) wrote in his book, Two hundred years of agricultural education in Georgia, that James Oglethorpe planned a program of agricultural education for the Colony before he set sail for the Georgia coast in 1732. He immediately put these plans into practice by making use of the agricultural practices of the Indians in the area, establishing an experimental farm for trying out new crops and cultural methods, and providing special instructors and training in agriculture for all colonists. Wheeler (1948) traced agricultural schools in Georgia from 1738 through 1948 and reported that a major component of these early programs were agricultural experience programs. These programs ranged from basic to very elaborate. What each of the programs provided, other than real life experience, was a means for the participants to earn money for their future. Today, the secondary school Agricultural Education program in Georgia has evolved to a modern offering that features class and laboratory instruction, the FFA, and supervised agricultural experience programs (SAEPs).

While other parts of the Agricultural Education Program have been widely studied, the economic impact of SAEPs has been mostly overlooked. An intensive review of current literature found little information that directly addressed the economic returns to SAEP programs. A recent independent study of a random sample of FFA New Horizons readers by Farm Progress Companies, Inc., revealed that the nation's FFA members earned over $4 billion annually, which was an average of 258% of what other high school students earn -- $9,000 compared to $3,500 (National FFA Organization, 1999). The researchers concluded that FFA members were more serious about career exploration, and were highly motivated and knowledgeable about business, and committed to developing their career potential. When the commonly used factor of seven dollars to the community for every dollar earned by a given enterprise is used, the result is even more impressive. It is assumed that a proportion of the national results accrue to each of the states; however, no data were found relative to the returns to students' SAEPs in Georgia. Leaders in Agricultural Education were aware that significant dollars were being earned and spent in relation to the Georgia students' SAEPs, but no one seemed to know the specific economic impact that was being made at the local and state levels.

As this research was being carried out, the Georgia Vocational Agriculture Teachers Association was implementing a set of standards for the state's Agricultural Education Programs (GVATA, 1996). The GVATA is the primary professional association of Agricultural Educators in Georgia. These standards were developed and enacted on a voluntary basis by the members. The standards called for 80% of the students enrolled in Agricultural Education classes to have a SAEP. Even though the standards have since been revised, the SAEP requirement of 80% has remained intact. These standards are now part of the State Board of Education Standards for Agricultural Education (State Board of Education, 1998).

PURPOSE

The main purpose of this study was to determine the amount of money that circulated through the economy of Georgia, on average, each year by students who participated in SAEPs. Specific objectives were to determine the nature of Agricultural Education programs in regard to student enrollment, FFA involvement, number of students with SAEPs, and type of SAEPs; and to ascertain related demographic information concerning the teachers and the community.

METHODS AND PROCEDURES

The study used a descriptive, ex-post facto design that involved a representative sample of the 174 Secondary Agricultural Education Programs in the State of Georgia. In order to achieve a standard error of 10% or less and a 90% confidence level, a calculated sample size of 50 schools was required; however, 55 programs were selected, using every third program on the Directory of Agricultural Education Programs (State Department of Education, 1995). An individual teacher – usually the lead teacher – in each program received the survey instrument, along with a cover letter describing the research project. To increase the number of responses, the instrument was mailed with a stamped, return-addressed envelope. Non-respondents were mailed a second copy of the instrument and a follow-up personal contact was made to ensure response. Overall, a 67.2% response rate was achieved. In order to determine the representativeness of the sample, late responders were compared to the bulk of the early responders (Miller and Smith, 1983). Table 1

contains demographic data, which shows that the late respondents were very similar to the early respondents in areas of years at present location, years, teaching, and number of students with SAEPs.

Table 1.

Mean Demographic Differences between Early and Late Respondents (N=55)

Factor	Early Group M	Late Respondent M	Difference
Years at current location	12.8	11.3	0.5
Years teaching	15.5	14	1.5
Number of Students with SAEPs	50.6	46.5	4.1

Since no specific example was found in the literature, the researchers developed an instrument that contained the following areas: teacher information, community economic data, SAEP information and a section with Likert items designed to elicit teacher views as to the importance of SAEPs. The instrument was reviewed for content validity by faculty in Agricultural Education at the University of Georgia and by staff members in the Regional office. Changes were made for readability, as a result of these reviews. A copy of the instrument may be viewed in Exhibit A, at the end of the paper.

Responses were entered into a word processing program to compile the data for statistical analysis. Analysis was performed on the data by SPSS and SAS programs. Primarily descriptive statistics were utilized, including frequencies, percentages, means, standard deviations, range and totals. The data were analyzed by retaining cases having missing data. This was done to give accurate data for programs having SAEPs, as well as programs that may have had no SAEPs.

The other area of the instrument used to determine difference was in the Likert scale ratings of the importance of SAEPs to various parts of the Agricultural Education Program. These data can be seen in Table 2. There were some differences in responses, but only in three of the items. Thus it may be assumed that the Likert-type responses of the non-respondents would not have differed significantly from those who did respond.

Table 2.

Differences in Importance Ratings of SAEP Programs between Early and Late Respondents (N=55)

Importance of SAEPs:	Group M	Late M	Difference
To you as an Agricultural Education teacher.	4.1	3.8	.3
To your Agricultural Education Program.	4.1	3.2	.9
To your community.	3.8	3.6	.2
To the educational success of students.	4.1	3.6	.5
To the selection of a career path for students.	3.7	3.8	-.1
To the career success of graduated students.	3.8	3.8	0
To the future of Agricultural Education Programs in Georgia.	4.2	3.6	.6
To the future of agriculture in Georgia.	4.2	3.8	.4

The instrument requested demographic information on the teacher, the number and type of SAEPs that were used, the dollar amounts for wages, money spent, and money earned by SAEPs, and teacher perception of the SAEP program. The following topics were questioned:

> Teacher Information: Years in Agricultural Education, years at present location, degree held, and extended contract information. Also, the economic base of the community and FFA membership information was requested.
>
> SAEP Information: Questions were asked to gather information on a wide range of topics within the SAEP. These included wages, costs, profits, and numbers of participants in various project areas.
>
> SAEP Importance: This area was used to ascertain the feelings and thoughts of teachers on the importance of SAEPs in relation to the success of the Agricultural Education Program and the future success of the students that participated in the SAEP.

RESULTS/FINDINGS

Teachers responding indicated that they had taught at their present location for an average of 12.9 years and had 15.5 years of experience (Table 1). This indicates that teachers surveyed seldom move from their first teaching location. The typical respondent held a Masters or Specialist degree; 78.4% of respondents were on one hour extended-day contracts, and nearly six out of ten, 59.5%, were on some type of extended-year contract. These data are found in Table 3.

ERIC

The type of community that the programs represented was as follows: 43.2% of the communities were urban/suburban (over 5,000 in population) and 56.7% small town (5,000 or less population) or rural. The approximate proportion of the income in these communities that was from some form of agriculture averaged 27.6%.

Table 3.

Demographic Information of Respondents (N=55)

Demographic factors	Number Responding	Percentage
Educational level:		
Bachelor's	14	37.8
Master's	9	24.3
Education Specialist	13	35.1
Doctorate	1	2.7
Type of contract:		
No Extended Day	5	13.5
1 hour Extended Day	29	78.4
No Extended Year	15	40.5
11 Month	7	19.0
12 Month	15	40.5

The programs responding had an average of 97.7 students enrolled in the Agricultural Education and 65.6 FFA members. It was reported that the average program had 50.6 SAEPs. Twenty-seven programs or 48.6% had 50 or more students with SAEPs and 18 programs or 32.4% had between 20 and 50 students with SAEPs. Placement SAEPs accounted for 25.8 % of the number involved. Entrepreneurship SAEPs accounted for 49.8% and improvement SAEPs the remainder. These data may be seen in Table 4.

Table 4.

Departmental Demographics Affecting SAEP Numbers and Types (N=55)

Factor	Mean	SD	Minimum	Maximum
Total Ag. Ed. Enrollment	97.7	47.90	1	200
Total FFA Membership	65.5	55.42	0	260
Total SAEPs	50.6	49.40	0	200
Placement SAEPs	13.1	14.80	0	51
Entrepreneurship SAEPs	25.2	30.75	0	105
Improvement SAEPs	7.9	17.66	0	90

The typical program had 13 students with placement SAEPs who worked an average of 11.9 hours per week. The average income for these placements was $4.87 per hour. The average placement portion of an SAE program thus had an annual economic impact of $39,176 per department.

Programs averaged 25.2 ownership/entrepreneurship SAEPs. The expenditures of these SAEPs averaged $575 per year and the total income averaged $450. The ownership SAEPs had an average profit of $219 per year. The average amount of money changing hands in the local community from an ownership SAEP was $1244. Thus it was calculated that ownership SAEPs in the typical program contributed $31,336 to the local community annually.

SAEP programs varied greatly. Table 5 lists the types of SAEP and the average number per program for those responding.

Table 5.

Mean Number of Placement and Ownership SAEPs per Program in Georgia

SAEP type	M Number of students per program
Ownership/Entrepreneurship	
Swine	8.8
Beef Cattle	4.9
Poultry	3.1
Dairy Cattle	2.2
Rabbits	1.9
Goats	1.8
Other Livestock	1.0
Vegetables	4.7
Hay	2.6
Corn	2.1
Small Grain	1.3
Cotton	1.1
Truck Crops	1.6
Other Crops	4.5
Placement SAEPs	
On Farm	3.5
Farm Supply	2.2
Farm Equipment Company	1.6
Crop Purchasing	1.3
Livestock Sales	1.5
Other Placement	4.0

Information on improvement SAEPs was also solicited. The average program had eight improvement SAEPs on which was spent an average of $104 per year. The impact of a single program's improvement SAEPs averaged $832.

Overall, the typical Agricultural Education program was calculated to contribute $71,344 to the local community. When 174 programs were entered into the equation, the annual economic impact to the State of Georgia was calculated to total over $12 million.

The respondent's perception of the importance of SAEPs was determined through the use of eight questions with choices on a five-point Likert scale. A response of 5 indicated extreme importance, while a response of 1 indicated little or no importance. The data regarding perceptions of SAEP's importance may be viewed in Table 6.

ERIC

Table 6.

Mean Ratings of Importance of SAEPs (N=55)

Importance of SAEPs:	M	SD	Range
To the future of Agricultural Education Programs in Georgia	4.18	.907	2 - 5
To the future of agriculture in Georgia	4.16	.957	2 – 5
To the educational success of students	4.13	1.031	2 - 5
To you as an Agricultural Education teacher	4.10	.936	2 - 5
To your Agricultural Education Program	4.08	1.115	1 - 5
To your community	3.81	1.010	1 – 5
To the career success of graduated students	3.78	.975	1 - 5
To the selection of a career path for students	3.73	.990	1 - 5

The above responses indicated that the SAEP program in Georgia was very much a part of the local Agricultural Education program. Teachers generally value SAEPs highly, although there was a large range in responses. This was likely due to the impact that it has on the students and the local community. Respondents also saw SAEPs as being important to the future of agriculture and Agricultural Education in Georgia.

CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

The economic value of Georgia's SAEPs was extrapolated from the data to total over $12 million per year. Since the data which allowed this figure were reported before GVATA standards were finalized and adopted as part of the State Board of Education policy, figures for the late 1990's could exceed $16.0 million. With nearly one-half of the teachers indicating that SAEPs were of importance to the success of their Agricultural Education programs, and that SAEPs were of importance to the future of agriculture in Georgia, the numbers of SAEPs should increase substantially during the decade of the new millennium.

Further research in this area should be considered. This is especially important during a time when Georgia's Agricultural Education programs are changing to the "new agriculture", such as emphasis on agriscience and the green industry. New ideas must be developed to increase the effectiveness of each area of the Agricultural Education program. Increases in the total number, type, and economic impact of the new SAEPs can have a significant effect on the local and state economies. Furthermore, research in the areas of livestock SAEPs is also needed. The large number of participants in local, regional, and state livestock shows is increasing each year. These participants, parents and other relatives usually stay overnight in the area of the show. This contributes to increased hotel and eating establishment income.

Without the current level of SAEP participation, the Georgia Agricultural Education program would not be as healthy as it is today. The students would not receive the "real world" experiences that a comprehensive program provides. Agricultural Education would not be fulfilling the purpose envisioned by early pioneers in education. The model developed by Oglethorpe as he pioneered American agricultural education is carried on by Agricultural Education in Georgia.

REFERENCES

GVATA. (1996). Program Standards in Agricultural Education. Carrollton, GA: Author.

Georgia Department of Education. Agricultural Education Directory – 1995. Atlanta, GA: Author.

Miller, L. & Smith, K. (1983). Handling non-response issues. Journal of Extension, XXI, September/October.

National FFA Organization. (1999, May 1). FFA Update. Indianapolis, IN: Author. Vol. XXVIX, no. 5.

State Board of Education. (1998, November). Minutes of November Session. Atlanta, GA: Author.

Wheeler, John T. (1948). Two hundred years of agricultural education in Georgia. Danville, IL: The Interstate.

ECONOMIC IMPACT OF SUPERVISED AGRICULTURAL EXPERIENCE PROGRAMS IN GEORGIA

A Critique

James E. Christiansen
Texas A&M University

Contribution and Significance of Research

In this time of decreases in funding for vocational programs, of questions about accountability in programs, of questions about the value of secondary level programs in agriculture, and questions about the value of _investment_ in education in general, this research into the economic impact of supervised agricultural experience programs in Georgia is most timely. The research reported is a significant benchmark for guiding further research on this topic, and this needs to be done.

Procedural Considerations

The descriptive, ex-post facto research design was appropriate. Following up on non respondents and comparing late respondents with early respondents to determine if the probability existed that significant differences might exist between respondents and non-respondents was a sound procedure. One question occurs, however. Because there were only 174 secondary level agricultural education programs in the state, and a mailed questionnaire was used, why was a representative sample of 55 programs selected to be contacted instead of contacting the whole population? Because of the nature of the information sought, there would have been less need for extrapolating to the general population, even if the rate of response was not as high as desired. Furthermore, the likelihood would exist that any unique student-income activities, if present, would have been identified and thus would have been likely to be reported.

Questions for Consideration

It was reported that almost 98 members were enrolled in an average agricultural program and that the average program consisted of 51 SAEPs. Should we reexamine why the ratio of students enrolled in an agricultural science to the number of SAEPs is slightly over two-to-one? It is true that _without the current level of SAEP participation, the Georgia Agricultural Education program would not be as healthy as it is today_ (p. 7). This reviewer_s question is: Why is the level of SAEP participation not higher? This we need to determine.

Why were the salaries of the teachers not determined? By doing so, a ratio of average salary per department to average student placement SAE income per department, a ratio of teacher salary to average ownership production enterprise income, and a ratio of salary to average total student SAEP income could be determined. This reviewer remembers vividly what happened when his school board learned that the total net student income from the productive enterprises of the 46 students enrolled in vocational agriculture the previous year was more than eight times greater than his salary. Not only did he get a salary increase that jumped two steps on the district's salary scale, he got a 400%+ increase in his departmental operating budget. Furthermore, no more

was said by the local business owner on the board questioning the value of the high school vo-ag program when he saw figures on where students shopped to get the things needed in their productive enterprises. Would such information make us more accountable to both our supporters and our critics?

ERIC Full Text Provided by ERIC

Supervised Agricultural Experience: Revisiting Supervised Agricultural Experience

William Camp
Virginia Polytechnic Institute
and State University

Maureen Fallon
Virginia Polytechnic Institute
and State University

Ariane Clarke
Virginia Polytechnic Institute
and State University

REVISITING SUPERVISED AGRICULTURAL EXPERIENCE

Agricultural Education has changed dramatically since 1917, when the passage of the Smith-Hughes Act led to a formalized structure of vocational agriculture programs in secondary high schools throughout the United States. Smith-Hughes required that farm projects be an integral part of all agriculture education programs (Moore, 1988). That early farm project program has evolved over time into the current Supervised Agricultural Experience (SAE) program. Today's agricultural educators are faced with the continuous challenge of reexamining the structure and curriculum of Agricultural Education, of which SAE forms one important component, as we approach the coming century (Dyer & Osborne, 1996).

When the farm project approach was conceptualized in the early 1900s, nearly 20 percent of the U.S. population resided on farms. The years since then have produced dramatic advances in agricultural sciences that have changed the face of agriculture forever. Hybrid crops, animal growth hormones, conservation practices, synthetic fertilizers, pesticides, and sophisticated machinery made farming more efficient and less labor intensive. By the mid 1980s only 2.2 percent of Americans lived on farms, and only half this number reported farming as their main

occupation. Yet, as of the late 1980s, nearly 20 percent of the labor force worked for the agriculture industry in some capacity (National Research Council, 1988). Clearly, Agricultural Education is no longer primarily in the business of training farmers. Our students are learning about biotechnology, computers, animal science, environmental science, crop science, forestry, wildlife science and many other facets of a growing food and fiber sector. If it is to remain viable into the new century, agricultural education, *en toto*, including its practical experience Supervised Agricultural Experience (SAE) component, must reflect the current reality and trends in agriculture.

THEORETICAL FRAMEWORK

A great deal of research has been done to prove the importance of Supervised Agricultural Experience in a comprehensive agricultural education program. The literature shows overwhelming support for the continuation of SAE programs. Studies have positively linked participation in SAE to student achievement in agricultural knowledge (Cheek, Arrington, Carter, & Randell 1994; Dyer & Osborne, 1996). Dyer and Williams (1997) examined the relevant literature on SAE, and determined that SAE is an integral component in agricultural education. Yet a study conducted by Steele (1997), reported that though agricultural educators espouse the theory of SAE, the actual quality and quantity of experiential programs is declining in the state of New York. One problem that agriculture educators face is that dramatic changes in agriculture and agricultural education have caused a lack of focus and direction in SAE (Dyer & Osborne, 1996).

SAE: Experiencing Agriculture (Barrick, et al., 1992) is the primary document in use within the profession of agricultural education today regarding the program of Supervised Agricultural Experience. That document defines and describes SAE as follows, "The actual planned application of concepts and principles learned in agricultural education. Students are supervised by agricultural teachers in cooperation with parents/guardians, employers and other adults who assist them in the development and achievement of their educational goals. The purpose is to help students develop skills and abilities leading toward a career" (Barrick, et al, 1992, p. 1). Since this definition emerged in 1992, there has been no published research as to the effectiveness of the definition in relaying the scope and purpose of SAE. The major components of SAE are supported by the School-to –Work Opportunities Act of 1994. The 1994 Act required that school-to-work opportunities be planned, supervised, and have some educational purpose, and help students obtain skills leading toward a career (Hamilton & Hamilton, 1997). The current definition of SAE does not limit the scope of a project, but merely requires that the SAE be related to agriculture, supervised by an adult, and planned with educational and career objectives in mind.

A large amount of research exists supporting the importance and implications of a strong SAE program (Dyer & Osborne, 1996). However, little research exists to determine the components of Supervised Agricultural Experience. The Barrick, et al (1992) handbook is used in teacher education courses as a basis for teaching about SAE. The major components of SAE as listed in that publication, Entrepreneurship, Exploratory, and Placement are widely accepted in the field as encompassing all of SAE (Hoover & Arrington, 1994). Various articles in the literature suggest additional categories such as Improvement, Experimental, Analytical, and Volunteerism as valid components of SAE (Connors, 1992; Grellner & White, 1992; Moore & Flowers, 1993). Additional alternatives to the accepted components of SAE, such could open up new avenues for

students interested in the scientific area of agriculture. An expanded list of components might allow for non-traditional SAE projects that still meet the requirements defined in SAE, but do not fit in to any of the existing categories.

Supervised Agricultural Experience remains an important part of agricultural education. The School-to-Work Act of 1994 supports the need for programs like SAE. However, as the agriculture industry changes and more non-traditional students enroll in agriculture classes, SAE must adapt to meet the needs of a new clientele. More research is needed as to the specific scope and structure of SAE in today's agricultural education. Declining numbers in SAE programs should be a red light, alerting the leaders in agricultural education that a focus and direction must be given to the SAE program nationwide in order to ensure its survival in the twenty-first century (Steele, 1997).

PURPOSE AND OBJECTIVES

The purpose of this study was to seek a national consensus on the future, name, definition, and working structure for the experiential component of the agricultural education program currently referred to as Supervised Agricultural Experience. The research had four major objectives:

1. To determine whether an intra-curricular program providing supervised agricultural experience should be continued in Agricultural Education.
2. To assess whether the name "Supervised Agricultural Experience" should be changed.
3. To seek a consensus definition of that program.
4. To identify the components that should be used to operationally describe a program designed to provide supervised experience for agricultural education students in the foreseeable future.

METHODS AND PROCEDURES

Population and Sample

The population for this study consisted of professors of Agricultural Education, secondary agricultural teachers, other agricultural education professionals, and other interested parties who considered themselves experts on Supervised Agricultural Experience. A call for nominations was made to Agricultural Education professionals through the auspices of the National Council for Agricultural Education and the professional listserv of the American Association for Agricultural Education. Sixty-six people were nominated, and of those, forty people assessed themselves to be experts and agreed to participate. Thirty-seven percent of the panel consisted of Agricultural Education professors, 33% of the participants were secondary agricultural teachers, 20% were professionals in other aspects agriculture, and 10% were state education department directors. Members of the panel represented fifteen states.

Instrumentation and Data Collection

Traditional Delphi techniques were used, which means that multiple instruments were required. The Round 1 instrument was organized in four parts. Part I identified the importance panel members placed on Supervised Agricultural Experience as a part of a comprehensive Agricultural Education program. Part II assessed whether the name Supervised Agricultural Experience (SAE) should be changed to better represent future practice in agricultural education. The third part sought input to the definition of SAE. Part IV included the actual Delphi question, which asked panelists to identify the major components of SAE. A validation panel consisting of agriculture teachers and agriculture education professors not selected as part of the sample was used to provide feedback on the instrument. A small field test was conducted using agricultural education teachers not participating on the panel. The instruments for Rounds 2-3 were derived from the responses to the respective preceding Rounds, so re-validations and field tests were not conducted.

The Round 1 survey sought initial input from the panel members. The Round 2 survey incorporated input from the panelists by listing and asking for ratings of suggested program names, definitions, and components of the program and sought answers to several specific questions suggested by the comments made in the first round. The Round 3 survey refined the items, provided the panel's mean ratings for each item, and asked several clarifying questions. The Round 4 survey asked several more clarifying questions, provided the panel's mean ratings and the individual's ratings for each item for which consensus had not been reached in Round 3.

The rating system used throughout the study was a simple five-point Likert-type scale using a stem statement that elicited a strongly disagree to strongly agree rating relative to each item. Data for each round were collected using mailed surveys. After appropriate follow-ups, the final response rate was 88% on Round 1, 50% on Round 2, 68% on Round 3, and 78% on Round 4.

Analysis of Data

Qualitative and Delphi techniques as well as simple descriptive statistics were used to analyze the data. Throughout the study, a number of simple yes/no questions arose. Other parts of the study called for more free-form input, producing qualitative data that was examined using theme analysis techniques. The major part of the study involved consensus-seeking using Delphi techniques. The lack of a clear consensus in how to define consensus in the Delphi presented a minor challenge, because of the disparate nature of the panel. The decision was made to report means rather than interquartile ranges to increase the likelihood that the panel members would understand the meaning of the statistics. Consensus was defined a priori as a standard deviation of less than 1.0 for the item mean rating. Once consensus (standard deviation < 1.0) was reached, a mean rating in the agree half of the scale (mean < 3.0) was taken to indicate agreement that the category should be included. In the final results, the standard deviations of several categories remained above the pre-set value of 1.0, but the item mean ratings were far enough from the mean cut-off value of 3.0 that we decided against a fifth round.

FINDINGS

Continuation of the Program

Panel member were asked the following question: "As Agricultural Education moves into the next century and as we seek to reinvent Agricultural Education for 2020, should Supervised Agricultural Experience be an integral part of a comprehensive Agricultural Education program? Please justify your response with detailed reasons."

The unanimous response was that Supervised Agricultural Experience should remain an integral part of a comprehensive Agricultural Education program in the future. The most common justification for this statement was that SAE enhances classroom learning by providing real-life experience for students. Other reasons given were:

- SAE encourages students to learn more in class.
- Students get excited about SAE projects.
- A sense of ownership and pride is gained through SAE, which cannot be duplicated in the classroom.
- SAE is the foundation on which vocational education is based.
- Students should learn by doing.
- SAE provides the opportunity to learn about agriculture while actually working in the agricultural field.

Name of the Program

According to Deyoe (1953) and Barrick, et al. (1992), what we now call SAE has gone by a series of names and acronyms over the years. In the beginning, our predecessors referred to it as the Farm Project Program. A more recent term was Supervised Occupational Experience (SOEP) (Phipps & Osborne, 1988). In the current study, panelists were asked the following question: "What we now call SAE has gone by a series of names and acronyms over the years. At one time we referred to our Farm Project Program. A more recent term was Supervised Occupational Experience Program (SOEP). Should we rethink the term we use for this part of our program? If so, what terms would you suggest and why?"

In response to that question, 10 names were suggested and evaluated in the subsequent round, see Table 1. Consensus was reached in Round 3 that only SAE and SAEP (Supervised Agricultural Experience Program) were rated as agree or strongly agree, with those two names not statistically different in their respective ratings.

Because the ratings of the two top selections in Round 4 were not significantly different ($t = 0.18$), a forced choice between the two alternatives was presented in Round 4. Seventy-seven percent (24 out of 31) respondents felt that the name Supervised Agricultural Experience should not be changed. Comments indicated that the name SAE adequately represents all facets of agricultural education, even though some concern was voiced that SAE excludes such curricular options as natural resources management and horticulture. Many respondents also felt that changing the name would show indecisiveness among agricultural educators. There was no consensus as to what the name should be, among the fifteen percent of respondents who felt it should be altered.

ERIC

Definition of Supervised Agricultural Experience

The panelists were asked in Round 1 to respond to the following question: "If Supervised Agricultural Experience will be important to Agricultural Education in the future, what should be the definition of Supervised Agricultural Experience?" Responses were pooled and edited, then submitted to the panel to review in Round 2. The most common statements in Round 2 were synthesized to create a consensus definition for SAE. The consensus definition for Supervised Agricultural Education, according to the selected panel, is the following:

> SAE is the planned, supervised application of agricultural principles and concepts.
>
> SAE opportunities should serve to improve agricultural literacy, and skills and abilities required for careers in agriculture.

Components of Supervised Agricultural Experience

The Delphi portion of the study was conducted to identify the major components of SAE. The first questionnaire asked panel members to list major SAE categories. These responses were edited and combined into like categories. In Round 2, panel members rated the categories from strongly disagree to strongly agree regarding whether the item should be considered a "category" of SAE. Respondents also added several new categories in Round 2. The ranked list was revised and each suggested category was rated up to two more times. Components and activities of SAE receiving a consensus rating between one and four were taken as the final results.

Table 1
Expert Panel Responses [1] to "What Should We Call the Experiential Component of Agricultural Education?"

Mean Rating [2]	Std Dev	Program Name
1.73	0.87	Supervised Agricultural Experience (SAE)
2.04	0.68	Supervised Agricultural Experience Program (SAEP) [3]
3.25	1.12	Supervised Occupational Experience Program (SOEP)
3.77	1.18	Supervised Experience
3.85	1.20	Agri-Science and Natural Resource Experience Program (ANEP)
3.96	0.59	Career Experiences
4.07	1.04	Active Learning in Applied and Environmental Sciences (ALAES)
4.31	0.68	Supervised Agricultural, Environmental and Natural Resources Experience Program (SAENREP)
4.33	0.73	Active Learning in Food, Fiber, and Natural Resources (ALFFNR)
4.33	0.55	Work Based Learning

Notes:
1 Rating scale: Strongly Agree = 1 to Strongly Disagree = 5
2 Rating taken in Delphi Round 3, n=27
3 SAE and SAEP were rated significantly higher than all the other names but were not significantly different from each other

A surprise arose in Round 1. Because SAE and its predecessors had for many years been described as consisting of categories (currently entrepreneurship, exploratory, and placement) we had assumed that categories would not be controversial. A surprising number of comments from Round 1 indicated that such an assumption was unwarranted. Following are several particularly interesting observations in that regard.

- I am not sure that categories are necessary. If SAE is an experience outside the classroom that provides skill development, it might be all three (Exploratory, Placement, Entrepreneurial). I think this is an FFA Award problem, not an SAE problem.
- You might need to keep different types of records/information depending on the experience, but I don't think that necessitates SAE categories.
- If the FFA (agricultural education) is to continue including a diverse group of students, we will not be able to stay within these types of boundaries. We need to foster creativity within students and teachers, and not make specific categories.
- It's more important that projects teach responsibility, money management, communication, and a particular trade or skill. If those are accomplished, does it matter if it is in Exploratory, Entrepreneurship, or Placement?

As a response to that controversy, the comments were summarized and provided to the panelists in the Round 2 survey in the hope that the comments would help in the move toward consensus. As a result of still more questions arising in the comments from Round 2, a forced-choice question was asked in Round 3: "Do you favor organizing the program by providing categories of experiences?" When forced to choose, the panelists responded 25 yes to 3 no to organize SAE using categories.

The panelists in this study finally reached consensus that there should be eight major categories of SAE: Agribusiness Entrepreneurship, Agricultural Research, Agricultural Placement, Agricultural Production, Directed School Laboratory, Agricultural Communications, Agricultural Exploration, and Improvement Projects. See Table 2. After four rounds of the Delphi, clear consensus was reached on all but three nominated categories: agricultural communications, leadership, and improvement projects. In all three cases, the mean ratings were far enough from the item mean rating cutoff score of 3.0, that we made the decision not to use a fifth round in the attempt seek a lower standard deviation.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of the study, we offer the following conclusions and recommendations:

1. Conclusion: Supervised agricultural experience is a vital part of any comprehensive agricultural education program. Such experiences provide students an opportunity to take classroom principles and apply them in a contextual setting. Supervised experiences are at the heart of agricultural education. Students learn skills and practices by actually performing them.

Therefore we recommend that agricultural education should retain a strong emphasis on an integral, experiential program component designed to provide contextual application of in-class instruction.

Table 2
Expert Panel Responses [1] to "How should we organize the experiential component of our program?" in Rank Order by Final Mean Rating

Round 3		Round 4		
Mean [2]	St Dev	Mean [3]	St Dev	Category [4]
1.96	0.76			Agribusiness Entrepreneurship [5]
2.11	0.80			Agricultural Research [5]
2.41	1.01	1.87	0.63	Agricultural Placement [5]
2.48	1.16	2.15	0.88	Directed School Laboratory [5]
2.48	1.12	2.33	0.99	Agricultural Production [5]
3.02	1.06	2.71	1.13	Improvement Projects
2.63	1.11	2.77	1.01	Agricultural Communication [5]
2.81	0.99			Agricultural Exploration [5]
3.09	1.13	3.28	0.93	Agricultural Internship
3.12	1.60			Agricultural Leadership Development
3.70	1.03	3.40	1.16	Leadership
3.91	0.90			Experimental
3.96	1.02			Record Keeping
3.96	0.94			FFA Involvement
4.00	0.68			Applied Activities

Notes:

1. Rating scale: Strongly Agree = 1 to Strongly Disagree = 5
2. n for Round 3 was 27
3. n for Round 4 was 31
4. Categories marked with an asterisk (*) are those for which the consensus (standard deviation < 1.00) was reached for the item to be included (mean < 2.50) as a category of SAE.
5. Categories recommended for use in the SAE program based on a mean rating in the agree range (i.e., mean rating < 3.0)

2. Conclusion: In an ongoing attempt to better serve students, our program's experiential component has undergone several name changes throughout the history of agricultural education. The term "Agricultural" correctly defines all supervised experiences in an agriculture program. Though SAE projects might be non-traditional, they should still be related to agriculture. Another name change would also send the message that leaders Agricultural Education are unsure about the future of SAE. Agriculture Education needs to present a united front to the public, in order to remain a vital part of vocational education in an unsure future.

   Therefore, we recommend that the name "Supervised Agricultural Experience" not be changed.

ERIC Full Text Provided by ERIC

3. Conclusion: Supervised Agricultural Experience should be defined in broad, general terms. The most important factors for an effective SAE project are that it is well planned, supervised by an adult, based on some agricultural principle, complete records are maintained by the students, and that the student applies concepts learned in agricultural education. It is important that the definition of SAE does not deter students with innovative ideas. The old concept that SAE must be defined as "outside class time" was rejected in an early round. The definition should be broad enough to incorporate any project related to agriculture, yet definitive enough to require the basic necessities for an effective SAE.

   We recommend that the accepted definition of SAE should change from that currently in use to the following:

   > SAE is the planned, supervised application of agricultural principles and concepts.
   > SAE opportunities should serve to improve agricultural literacy and skills and abilities required for careers in agriculture.

4. Conclusion: SAE should continue to be structured in terms of categories, but it is time for the generally accepted categories to change. The currently accepted structure of SAE (Barrick, 1992) is entrepreneurship, placement, and exploratory.

   We recommend that those three categories should be replaced with eight: Agribusiness Entrepreneurship, Agricultural Placement, Agricultural Production, Agricultural Research, Directed School Laboratory, Agricultural Communications, Agricultural Exploration, and Improvement Projects.

DISCUSSION AND IMPLICATIONS

As the scope of agriculture broadens, our concept of Supervised Agricultural Experiences must be altered to meet the demand of students interested in new areas of agriculture. Traditional projects, such as animal husbandry or crop production are still conducted with much success, but SAE needs to account for non-traditional students, and students interested in agricultural research. Currently, the dominant description of SAE in the agricultural education literature lists Entrepreneurship, Placement, and Exploratory as the major components of SAE. Though these categories serve many students well, major changes are warranted based on this study to make SAE more useful in the future.

The feeling of the panel members was that Entrepreneurship should be divided into two categories: Agribusiness Entrepreneurship and Agricultural Production. While many argue that agricultural production is really just another form of entrepreneurship, the panel felt that the two are different enough to justify making the distinction.

According to these results, Agricultural Placement clearly should be retained as an SAE category. As our profession continues to move toward more community-based and work-based education, planned placement experiences should become increasingly important in agricultural education.

The panelists also felt, albeit marginally, that an older category of Improvement Projects should be re-added to the SAE structure. That category of SAE provides opportunities for students to gain experiences and to receive credit and recognition for them in areas not allowed by the current structure.

The decision to retain the Exploratory (renamed Agricultural Exploration) category was also accepted less than enthusiastically with a mean rating that was only slightly positive. The lack of a stronger showing for this long-used category may be because the appropriateness of middle school programs of agricultural education, where the exploration component is most pertinent, is still hotly debated in the profession. It would seem that as agricultural education moves still further away from a strict employment orientation, middle school programs should become more widely accepted. If that is indeed the case, an SAE category of Agricultural Exploration will become more important in the future.

Three new categories were suggested. Agricultural Research has been suggested several times in the literature and would provide opportunities for students to gain curricular credit for a wide array of research activities, both on campus and off. Scientific research into agricultural topics would fall into this category. The Agriscience Fair, which is used in some states, already offers a chance for students to receive recognition for these types of projects, so this new category of SAE would fit nicely into the existing infrastructure of Agricultural Education. The idea of using a Directed School Laboratory is somewhat more innovative. This SAE category would allow students to receive credit and apply for recognition of accomplishments made in conjunction with class-related laboratory experiences. Finally, adding the category of Agricultural Communications is also rather innovative and would provide opportunities for students in an area of growing emphasis in our profession.

FINAL THOUGHTS

SAE as it is currently structured is a vital component of a comprehensive local program of agricultural education and provides a substantive source of experiential learning as well as a source of motivation for our students. The most significant problem with SAE as it is currently practiced is that too many teachers view it as not appropriate in their specific settings. While that perception may be inaccurate, it is nevertheless widely held in the profession. The changes in the definition and structure of SAE recommended in this study should make SAE more flexible to our teachers, more valuable to their students, and more usable in the emerging agricultural education program of the future.

REFERENCES

Barrick, R. K., Arrington, L., Heffernan, T., Hughes, M., Moody, L., Ogline, P. & Whaley, D. (1992). SAE experiencing agriculture: A handbook on supervised agricultural experience. Alexandria, VA: National Council for Agricultural Education.

Cheek, J.G., Arrington, L.R., Carter, S., & Randell, R.S. (1994). Relationship of supervised agricultural experience program participation and student achievement in agriculture. Journal of Agricultural Education, 35(2), 1-5.

Connors, J. (1992). Volunteerism as SAE. The Agricultural Education Magazine, 65(6), 18-20.

Deyoe, G. P. (1953). Farming programs in vocational agriculture. Danville, IL: Interstate Printers and Publishers, Inc.

Dyer, J. E., & Osborne, E. W. (1996). Developing a model for supervised agricultural experience program quality: A synthesis of research. Journal of Agricultural Education, 37(2), 24-32.

Dyer, J. E., & Williams, D. L. (1997). Benefits of supervised agricultural experience programs: A synthesis of research. Journal of Agricultural Education, 38(4), 50-58.

Grellener, D., & White, J. (1992). Supervised agricultural experiences in the 21st century – Cutting edge or obsolete? The Agricultural Education Magazine, 65(6), 21-23.

Hamilton, S. F., & Hamilton, M. A. (1997). When is working work-based? Phi Delta Kappan. 78(9), 676-686.

Hoover, T., & Arrington, L. R. (1994). SAE research findings. The Agricultural Education Magazine, 67(5), 9-11.

Moore, G. E. (1988). The forgotten leader in agricultural education: Rufus W. Stimson. The Journal of the American Association of Teacher Educators in Agriculture, 29 (3), 50-58.

Moore, G., & Flowers, J. (1993). Strengthening programs through an expanded model for SAE. The Agricultural Education Magazine, 66(1), 18-20.

National Research Council. (1992). Understanding agriculture: New directions for education. Washington, D.C.: National Academy Press.

Phipps, L. A, & Osborne, E. W. (1988). Handbook on agricultural education in public schools. Danville, IL: Interstate Printers and Publishers, Inc.

Steele, R. (1997). Analysis of the continuing decline in use of supervised agricultural experience (SAE) in New York State. Journal of Agricultural Education, 38(2), 49-57.

SUPERVISED AGRICULTURAL EXPERIENCE: REVISITING SUPERVISED AGRICULTURAL EXPERIENCE

A Critique

James E. Christiansen
Texas A&M University

Contribution and Significance of Research

We witness declining percentages of participation in supervised agricultural experience (SAE) among students enrolled in secondary level programs of agricultural education. Some teachers say that SAE is not possible or appropriate for some of their students. In some states, this percentage of participation in SAE is hovering around 50%. One example is Georgia, to be reported in research by David West and Maynard Iverson at this conference. Consequently, while the phrase may be time-worn, for this research, it is true: this study is timely and needed.

The research concerns the very core of secondary level programs in agricultural education for which a national consensus must exist if such programs are needed, conducted, and do include an experiential component. The results concerning the third and fourth objectives pertaining to the most appropriate name and working structure or components for the experiential content in the program of agricultural education provide direction to the profession in the years ahead because of changes taking place in the agricultural industry and the resulting changes in preparation needed for people entering the industry. This study caused the participants in the study, and should cause the rest of us as well, to examine their philosophy of agricultural education. Teacher educators, secondary level agricultural teachers, professionals in other aspects of agriculture, and state department personnel from 15 states have reached consensus, or in some cases, near consensus, on the need for, what is, and what constitutes supervised agricultural experiences in programs of secondary level agriculture in the public schools in the United States. Consequently, what has been reported is a benchmark study addressing perceptions and conditions present in the late 1990s. The authors are to be commended for undertaking, reporting, and sticking their necks to examine the resulting implications for the profession.

Procedural Considerations

The advantage of using the Delphi technique was that thoughts, concerns, opinions, and experiences were provided by people who were ahead of _the pack_ of many people in the profession as they had been nominated and had expressed interest and expertise in SAEs. A question could be raised, however, about why there was only a 50% response for Round 2 and a 78% response rate for Round 4. This reviewer_s experience with other Delphi studies has been that the response rate for the final round is usually higher. Was there an explanation?

Questions for Consideration

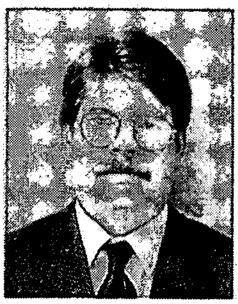
Looking ahead, what pragmatic, systematic, continuing steps can be incorporated into strategies that teacher educators, area and state-level supervisory personnel, and teachers can use to disseminate the revised definition of supervised agricultural experience (SAE) and the eight expanded categories of SAE resulting from this study among prospective teachers, other teachers

ERIC

of agriculture, employers of students graduating from secondary level programs, guidance counselors, school administrators, school board members, other teachers in school systems, and parents? This question has implications for action.

NAERC '99
Research Fresh from Florida

Changes in Missouri SAE Programs



James Graham
University of Missouri-Columbia

Robert Birkenholz
University of Missouri-Columbia

INTRODUCTION

Supervised Agricultural Experience Programs have been an integral component of secondary vocational agriculture instruction since it's inception with the Smith-Hughes Act of 1917. The National Vocational Education Act, (Public Law 347, Section 10), clearly stated "that such schools shall provide for directed or supervised practice in agriculture" (Phipps & Osborne, 1988, p. 550). From these beginnings, supervised practice evolved into supervised farming programs and more recently into Supervised Agricultural Experience (SAE). Such programs have changed from student experiences on a home farm to educational experiences that encompass the broad spectrum of modern agriculture.

This progression has been transitional in nature since 1917. Several key factors have prompted the evolution of experiential learning in agricultural education. The first of these factors was the Vocational Education Act of 1963, which broadened the scope of student learning experiences in agriculture. Section 10, part b of the Act stated that "any amounts allotted (or apportioned) under such titles, Act, or Acts for agriculture may be used for vocational education in any occupation involving knowledge and skills for agricultural subjects, whether or not such occupation involves work on the farm or farm home, and such education may be provided without directed or supervised practice on the farm" (Phipps & Osborne, 1988, p. 559). This passage expanded the scope of agricultural experiences to include agribusiness, horticulture, and other subjects that utilize an agricultural knowledge base.

ERIC

Another Act that contributed to the evolution of supervised experiences was the Carl D. Perkins Vocational Education Act, (Public Law 98-524), of 1984. Monies were provided to improve and create curriculum related to supervised experiential learning through this Act (Part B. Section 251-21) (Phipps & Osborne, 1988, p. 574).

Supervised Agricultural Experience Programs were further 'modernized' through The Strategic Plan for Agricultural Education (1989). This document stated that "Supervised experience should provide practical real-world experiences in agriculture, develop a positive work ethic and realistic occupation expectations" (The Strategic Plan, 1989, p. 5).

One main theme has held true throughout the history of supervised experiential learning in agricultural education; student success in learning can be directly linked to hands-on experiences outside the classroom setting. John Dewey pointed out, ". . . that there is no such thing as genuine knowledge and fruitful understanding except as the offspring of doing" (Dewey, 1916, p. 275). This "doing" has been the educational premise supporting the use of SAE's since the Smith-Hughes Act of 1917.

REVIEW OF LITERATURE

The literature revealed an emphasis on the theory and importance of supervised educational experiences throughout the past several years. In addition to examining the historical transitions of SAE's, research has focused upon the effects of broadening and improving experiential learning for agriculture students.

Studying the importance of supervised experiences involves a determination of the benefits perceived by partner entities. Some researchers have reported that many secondary agricultural education students did not participate in, or complete supervised experience programs in agriculture (Osborne, 1988; Bakar & McCracken, 1992; and Steele, 1997). Barrick and Hughes (1991) reported that parents and students placed less value on SAE's than other partner groups. Conversely, Barrick, Hughes and Baker (1991) determined that a majority of agriculture teachers and school administrators perceived a need for expanding the concept and increasing the number of students who complete supervised experience activities. Most of the teachers and administrators surveyed also favored requiring students to have SAE programs.

Each of the Agricultural Education partner groups perceived supervised experiential learning to be beneficial for students. However, those benefits were thought to be general benefits (personal, occupational, and educational) rather than technical benefits (Dyer & Williams, 1997). Students perceived the development of behaviors, attitudes, values, and human relation skills (Pals & Slocombe, 1985) as the most functional benefits. Research has also revealed a positive relationship between SAE participation and classroom learning (Barrick, Hughes, & Baker, 1991; and Dyer & Williams, 1997).

Researchers have suggested that two distinct areas must be further developed to expand the vision of Supervised Agricultural Experiences in an ever-changing agricultural industry. One of these areas is the expansion of the SAE concept to accommodate a more diverse student population enrolled in secondary agricultural education. Several researchers have examined the changing student population, limited opportunity students, and the increasing number of urban

students enrolled in agricultural education programs (Foster, 1986; Pals & Slocombe, 1988; Barrick, Huges & Baker, 1991; and Dyer & Osborne, 1996). Specifically, Phipps and Osborne stated in their book:

> "The need for developing alternative opportunities for supervised occupational experience programs is clearly apparent. Students enrolled in vocational programs today have extremely diverse interests and backgrounds. . . . Teachers will become much more flexible and creative in assisting students to plan and conduct SOE's" (1988, p. 31).

The changing student population in agricultural education programs has created a situation where agriculture teachers must be more creative in promoting the development of SAE programs.

Research indicated that teachers perceived the need for more training and a broader curriculum in relation to planning and conducting supervised experiences (Pals & Slocombe, 1985; Foster, 1986; Osborne, 1988; and Dyer & Osborne, 1995). Osborne (1988), observed that a majority of agriculture teachers had backgrounds in production agriculture, and should be encouraged to expand and diversify SAE programs among their students. Birkenholz and Stewart (1991) found that agriculture teachers in Missouri had used innovative opportunities and strategies to provide students with desired experiences.

Overall, the literature suggested that student participation in SAE programs and the types of experience programs have changed over the past several years. This study was conducted to investigate the changes and current status of Supervised Agricultural Experience programs for students enrolled in secondary Agricultural Education programs in Missouri.

PURPOSE AND OBJECTIVES

The purpose of this study was to assess the status and trends associated with supervised agricultural experience programs for secondary agriculture students in Missouri from 1988 to 1997. Specific questions for the study were:

1. How has secondary Agriculture enrollment in Missouri changed over the past ten years?
2. How have SAE programs changed in Missouri over the past ten years?
3. How has student labor income from SAE programs changed in Missouri over the past ten years?

PROCEDURES

Data collected for this study were compiled from state reports completed by secondary agriculture teachers beginning with the 1987-88 school year and ending with the 1996-97 school year. These reports were submitted by secondary agriculture teachers to the Missouri Department of Elementary and Secondary Education (DESE) on July 1st, after the close of each school year.

RESULTS/FINDINGS

Data presented in Figure 1 depicts the annual enrollment in secondary Agricultural Education programs and SAE participation in Missouri from 1988 to 1997. Student enrollment in agricultural education programs increased from 12,143 in 1988 to 18,914 in 1997 for a total increase of 6,771 (+55.8%) students. SAE participation increased from 10,146 in 1988 to 15,946 in 1997, for an increase of 5,800 (+57%) students. In 1988, 83 percent of the students enrolled in agricultural education programs completed an SAE program, and during 1997, 84 percent of the enrolled students completed an SAE program.

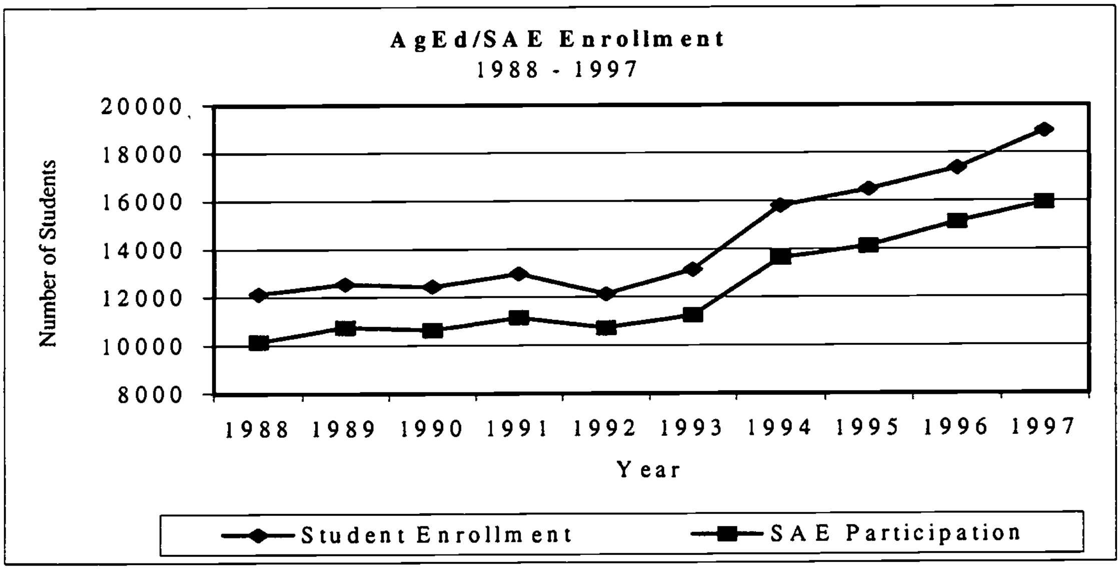


Figure 1

Data presented in Figure 2 illustrate shifts in the types of SAE programs over the ten year time period. Ownership SAE programs decreased from 5,070 in 1988 to 3,779 (-25.5%) in 1997. Conversely, placement SAE programs increased from 3,242 in 1988 to 7,445 (+130%) in 1997, and combination ownership/placement SAE programs increased from 1,834 in 1988 to 4,722 (+157%) in 1997.

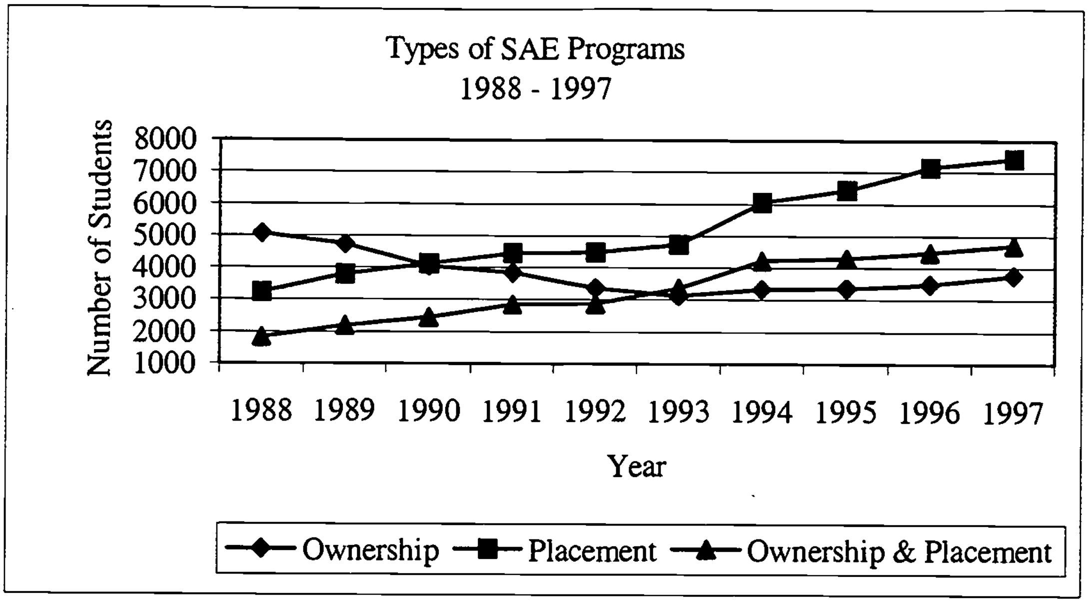


Figure 2

The data presented in Table 1 reveals the ten most popular SAE programs in 1988 and 1997, respectively. In 1988, the most popular SAE program was Beef Production (n=3,025), followed by Placement in Production (n=2,466) and Placement in Agribusiness (n=2,412). In 1997, the most popular SAE program was Placement in Agribusiness (n=6,806), followed by Placement in Production (n=4,699) and Beef Production (n=3,680).

Table 1

Top 10 SAE Programs in 1988 and 1997			
1988		**1997**	
SAE Program	n	SAE Program	n
Beef Production	3,025	Placement – Agribusiness	6,806
Placement – Production	2,466	Placement – Production	4,699
Placement – Agribusiness	2,412	Beef Production	3,680
Swine Production	1,398	Placement – Directed Exp.	1,512
Custom Work	1,199	Horse Production	1,452
Agribusiness	732	Dogs	810
Horse Production	621	Agribusiness	805
Dairy Production	551	Pasture Production	503
Soybean Production	547	Sheep Production	481
Placement – Laboratory	477	Custom Work	448

The data displayed in Table 2 show the student labor income from SAE programs in 1988 and 1997. Average student labor income from ownership SAE's was $1,466 in 1988 and decreased to $1,366 in 1997 for a total decrease of $100 (-6.8%) per student. Average student labor income from placement SAE's was $1,097 in 1988 and increased to $1,659 in 1997 for an

increase of $562 (+51.2%) per student.

In 1988, student labor income from ownership SAE's amounted to slightly over $10 million whereas placement programs generated about $5.6 million. By 1997, SAE student labor income from ownership programs had increased to $11.6 million, whereas placement income had nearly quadrupled to $20.2 million over the ten year period.

Total SAE student labor income increased by $1,490,981 for ownership programs, and by $14,623,673 for placement programs for a total increase of $16,114,654. In 1997, Missouri Agricultural Education students reported a total SAE labor income of $31,801,397. The average SAE student labor income was $1,546 in 1988 and increased to $1,994 in 1997.

Table 2

Student Labor Income Generated from SAE Programs					
1988			1997		
SAE Program	Amount Per Student	Amount Total	SAE Program	Amount Per Student	Amount Total
Ownership	$1,466	$10,119,230	Ownership	$1,366	$11,610,211
Placement	$1,097	$ 5,567,513	Placement	$1,650	$20,191,186
Totals	$1,546	$15,686,743	**Totals**	$1,994	$31,801,397

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

There has been a steady increase in enrollment in agricultural education programs in Missouri over the past ten years. Coincidentally, there has been an increase in the number of students participating in Supervised Agricultural Experience Programs. However, there are a number of students (2,968 or 16%) who are not receiving the benefits of experiential learning activities. This group of non-participants can be attributed to a number of factors, but may be partially due to the increased number of non-traditional students enrolled in the agricultural education programs. Along with this new student base, there is also a lack of home-based facilities, resources, and support. Agriculture teachers may also lack the appropriate training, background, and educational materials needed to work with non-traditional students.

There has also been a shift in popularity from ownership SAE's to placement programs. Within the ten year period of this study, agribusiness placement experiences have nearly tripled, and the number of students with placement programs in agriculture production has nearly doubled. These shifts are reflective of the changing student population in agricultural education programs. More non-farm students are enrolling in programs who lack opportunities for ownership SAE programs, and are therefore more likely to take advantage of placement program opportunities, both in agribusiness and in production agriculture.

Total SAE student labor income has doubled within this time frame, showing an economic benefit of supervised experiences to local communities. However, based upon the Consumer Price Index, (CPI), the SAE dollars earned by students in 1997 reflect about a $10 million dollar increase over the 1988 total SAE earnings figure. Also, there was a decrease in the student labor income resulting from ownership SAE programs. This finding may have implications for

Agricultural Education programs in the future. Additional research is needed to identify the factors that have contributed to the decline of student labor income from ownership programs.

Based upon the information gathered, it is evident that increased preparation and training is necessary for agriculture teachers to introduce, conduct, and maintain supervised experience programs that meet the needs of non-traditional students. Inservice training and new curriculum materials are needed to meet these students' needs.

In so far as Supervised Agricultural Experience Programs are based upon classroom learning, it is important that agriculture educators have access to instructional materials to be used in teaching students about the scope of the agriculture industry, focusing more on agribusiness and research as opposed to production. Additional research is needed to assess Missouri agriculture educators' perceptions of Supervised Agricultural Experience Programs, and to ascertain perceived weaknesses toward the full utilization and implementation of Supervised Experience programs as a tool to enhance student learning.

Recognizing the existence of the philosophical basis for promoting student experience programs, innovative strategies are needed to prepare teachers to accommodate the needs of students who are more heterogeneous than in the past. Further research efforts should be directed toward the development of program standards that may be applied to new types of SAE programs to ensure that new and innovative programs continue to provide the educational benefits envisioned by the authors of the Smith-Hughes Act of 1917.

ERIC Full Text Provided by ERIC

REFERENCES

Bakar, A.R. & McCracken, J.D. (1992). Youth organizations and supervised agricultural experience participation as predictors of the career maturity of agricultural education students. Columbus, OH: The Ohio State University, Department of Agricultural Education. (ERIC Document Reproduction Service No. ED 369 917)

Barrick, R.K., Hughes, M., & Baker, M. (1991). A review and synthesis of research on supervised experience in agriculture. Columbus, OH: The Ohio State University, Department of Agricultural Education. (ERIC Document Reproduction Service No. ED 340 900)

Barrick, R.K. & Hughes, M. (1991). Perceptions regarding supervised experience programs: Past research and future direction. Journal of Agricultural Education, 36 (4), 31-36.

Dewey, J. (1916). Democracy and education. New York: Macmillan Publishing Co., Inc.

Dyer, J.E. & Osborne, E.W. (1995). Participation in supervised agricultural experience programs: A synthesis of research. Journal of Agricultural Education, 36 (1), 6-14.

Dyer, J.E. & Osborne, E.W. (1996). Developing a model for supervised agricultural experience program quality: A synthesis of research. Journal of Agricultural Education, 37 (2), 24-33.

Dyer, J.E. & Williams, D.L. (1997). Benefits of supervised agricultural experience programs: A synthesis of research. Journal of Agricultural Education, 38 (4), 50-58.

Foster, R.M. (1986). Factors limiting vocational agriculture student participation in supervised occupational experience programs in Nebraska. The Journal of the American Association of Teacher Educators in Agriculture, 27 (4), 45-50.

Osborne, E.W. (1988). SOE programs in Illinois-Teacher philosophies and program characteristics. The Journal of the American Association of Teacher Educators in Agriculture, 29 (3), 35-42.

Pals, D.A. & Slocombe, J.W. (1985). Supervised occupational experience programs in vocational agriculture. Moscow, ID: Idaho University Cooperative Extension Service. (ERIC Document Reproduction Service No. ED 364 705)

Phipps, L.J. & Osborne, E.W. (1988). Handbook on agricultural education in public schools. (5th ed.). Danville, IL: The Interstate Printers & Publishers, Inc.

Steele, R. (1997). Analysis of the continuing decline in the use of supervised agricultural experience (SAE) in New York State. Journal of Agricultural Education, 38 (2), 49-58.

Stewart, B.R. & Birkenholz, R.J. (1991). Outcomes of changing supervised agricultural experience programs. Journal of Agricultural Education, 32 (3), 35-41.

Summit on Agricultural Education. (1989). The strategic plan for agricultural education. Washington, D.C.: Author.

CHANGES IN SAE PROGRAMS IN MISSOURI

A Critique

James E. Christiansen
Texas A&M University

Contribution and Significance of Research

As was mentioned in reviewing the research, Revisiting Supervised Agricultural Experience, conducted by Bill Camp at Virginia Polytechnic Institute, we are witnessing changes, including declining percentages, in participation in supervised agricultural experience (SAE) among students enrolled in secondary level programs of agricultural education. While in some states, this percentage of participation in SAE is about 16% less than the number enrolled in agriculture, as reported in this Missouri study, in other states this level of participation hovers around 50%. One example is the research to be reported by David West and Maynard Iverson at this conference, _Economic Impact of Supervised Agricultural Experience Programs in Georgia._ We keep hearing some teachers say that SAE is not possible or appropriate for some of their students. We read that parents and students may not place a high value on SAE (Barrick and Hughes, 1991). Consequently, an examination of the status and trends associated with supervised agricultural experience programs for secondary level agricultural students in one state over a 10-year period provides some valuable insights for curriculum developers and program planners. As has been mentioned elsewhere, the research reported concerns a topic at the very core of secondary level programs in agricultural education as we enter the 21st century.

Questions for Consideration

Could this study be replicated in other states in the four regions of the American Association for Agricultural Education to see what their experiences have been? If we find that drastic changes in the makeup of the ten top-ranking SAE programs have taken place in those states as has been the case in Missouri, does an implication exist that the FFA career development event (contest) program at state and national levels need to be revised? For example, dairy and swine events may not be appropriate in Missouri if those programs don_t make the list of top 10 SAE programs with respect to student participation. Also, should the curriculum development centers in the different states examine the extent to which their inventory contains materials suitable for these changing areas of agricultural experience?

While not addressed in data reported in the study itself, at least in this paper, an implication was drawn that _along with this new student base (of non-traditional students enrolled) there is also a lack of home-based facilities, resources, and support._ If this is the case, should we not find out what teachers in innovative programs are doing to overcome these obstacles and disseminate these findings to the profession?

The study included the conclusion that _based upon the information gathered, it is evident that increased preparation and training is necessary for agriculture teachers to introduce, conduct, and maintain supervised experience programs that meet the needs of non-traditional students. In-service training and new curriculum materials are needed to meet these students_ needs._ However, nothing was reported in the study that warrants that particular conclusion as no attempt was

made to examine preparation and training possessed by the teachers and to compare that with the preparation and training needed with respect to changes in SAE programs.

NAERC '99
Fresh Florida

Integrating Science in Agricultural Education: Attitudes of Indiana Agricultural Science and Business Teachers

Mark Balschweid
Purdue University

Gregory Thompson
Oregon State University

INTRODUCTION/THEORETICAL FRAMEWORK

The concept of integrating science into agricultural education programs has been supported from various sources for over a decade (A Nation at Risk, 1983; Understanding Agriculture: New Directions for Education, 1988; Secretary's Commission on Achieving Necessary Skills, 1991). More recently, the United States Department of Agriculture funded a competitive grants program designed to strengthen agricultural education with the specific intent to prepare more students to pursue careers in agriscience and agribusiness by incorporating agriscience into science, business, and consumer education programs (U. S. Department of Agriculture, 1999).

The call for integration of academic and applied concepts can be heard from both academic and vocational sources. The American Association for the Advancement of Sciences has recommended connecting what students learn in school through interdisciplinary links, real-world connections, and connections to the world of work (Project 2061, 1993).

Currently in Indiana, curriculum reform encompasses every level of instruction from primary through pre-service and in-service teacher education. Purdue University Agricultural Education faculty are currently in the process of restructuring the plan of study used to prepare Agricultural Science and Business teachers in Indiana. At the center of the debate: What courses should be required of undergraduate Agricultural Education majors to prepare them for teaching secondary Agricultural Science and Business in the 21st century? And, what significant factors exist that cause teachers in the classroom to integrate science into the agriculture curriculum?

Before significant changes are made in the current, undergraduate teacher education program it is important to measure the perceptions and practices of teachers currently in the field. The perceptions and attitudes of practitioners can add significant evidence that could influence what courses and experiences should be included in the teacher education program and future teacher in-service workshops.

The theoretical/conceptual model that supports the integration of science with applied sciences is found in brain-based theory where Caine and Caine (1994) summarize that various disciplines relate to each other and share common information that the brain can recognize and organize. The authors add "the part is always embedded in a whole, the fact is always embedded in multiple contexts, and a subject is always related to many other issues and subjects" (p. 7). Evidence exists that student performance increases when students are taught courses that integrate science and agriculture (Roegge & Russell, 1990).

In a national study, Thompson (1996) found Agriscience teachers perceived that undergraduates would be better prepared to teach if they received instruction on how to integrate science and if they student taught with a cooperating teacher who integrated science. Thompson also concluded that agriscience teachers believed teacher preparation programs should provide in-service training for teachers on how to integrate science and recommended that in-service programs be offered to assist teachers in integrating science into the agricultural education curriculum.

Waters and Haskell (1989) emphasized that involving the learners in the process of planning an in-service education program increases the likelihood of implementing relevant programs. Norris and Briers (1989, p.42) stated "teachers' perceptions toward the change process (need for the change, amount of teacher input into the change process, and manner in which the change was managed, etc.) is the single best predictor of the teacher's...decision concerning adoption of the change."

PURPOSE/OBJECTIVES

The purpose of this study was to determine how Indiana Agricultural Science and Business (ASB) teachers perceived the impact of integrating science on agricultural education programs. To fulfill the purposes of the study, the following research questions were addressed:

1. What were selected demographic variables of Indiana ASB teachers?
2. What were the perceptions of ASB teachers concerning teaching integrated science?
3. What were the perceived barriers to integrating science in the agricultural education program?
4. What were the ASB teachers' perceptions concerning student enrollment since integrating science into their agricultural education program?
5. What were the ASB teachers' perceptions concerning support of the agricultural education program since integrating science?

METHODS/PROCEDURES

The target population for this study consisted of current Indiana Agricultural Science and Business (ASB) teachers ($\underline{N}$ = 243). The sample population consisted of all Indiana ASB teachers employed during the fall 1999 semester ($\underline{N}$ = 243) that responded to the mail-in survey. Purdue University's Agricultural Education Department provided the researchers with a current database containing the name and school address of each teacher. Caution should be exercised when generalizing the results of the study beyond the accessible sample.

The Integrating Science Survey Instrument developed by Thompson and Schumacher (1997) was used to identify the perceptions of the ASB instructors. Two additional questions were added to the survey to acquire state specific information concerning teacher preparation curriculum reform. Validity of the instrument was established by Thompson and Schumacher (1997). As a measure of the reliability of the attitude scale, internal consistency was established using Cronbach's alpha (α = .88 pilot study, and .81 Instrument).

The survey instrument and cover letter were mailed to the subjects. Elements of Dillman's Total Design Method (1978) were utilized to achieve an optimal return rate. Usable responses were received from 170 teachers for an overall response of 70.0 %. Nonresponse error was controlled by comparing early and late respondents on the mean attitude scales using a t-test. The t-values showed the attitude means were not statistically significant.

RESULTS/FINDINGS

Indiana's Agricultural Science and Business teachers reported an average age of 40.2 years (SD=11.0), had 15.4 years (SD=10.6) of teaching experience and had taught approximately 13.1 years (SD=10.5) at their current school. Female Agricultural Science and Business teachers accounted for 21.2% of all respondents. The Agricultural Science and Business teachers reported that 29.0% of their students are female, 4.0% are minorities, 54% of their students are members of the National FFA Organization and 49.9% of their students have some form of Supervised Agricultural Experience (SAE). Almost three out of four teachers (72.2%) responded positively when asked if they had attended a workshop on integrating science into the agriculture curriculum, while 39.1% of teachers surveyed possess a science endorsement. Slightly more than half of the teachers (56.2%) reported their students receive science credit for successful completion of one or more of the approved Agricultural Science and Business courses taught in their Agricultural Education program.

The respondents were asked to respond to 39 statements regarding integrating science into their Agricultural Education Programs. Their responses were measured using a five point Likert-type scale where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree. Cronbach's Alpha for reliability was .84.

The raw mean scores for the 39 statements ranged from a low of 2.35 for the statement "the lack of a science teacher who is willing to help me integrate science concepts has been a barrier to integrating science in the agricultural education program" to a high score of 4.41 for the statement "people pursuing a career in agriculture must have a greater understanding of biological science than ten years ago". Overall, Indiana Agricultural Science and Business teachers rated 23% of the statements (9 items) with a 4.00 or greater on a 5 point Likert-type scale indicating they "agreed" or "strongly agreed" with the statement. Two statements (5%) were rated below 3.00 on the five point scale indicating respondents disagreed with the statement, with some

teachers strongly disagreeing. The remaining 28 statements (72%) were rated with scores between 3.00 and 4.00 indicating teachers were neutral or somewhat in agreement with the contents of the statement.

Research question two asked teachers their perceptions concerning integrating science. Table 1 shows the results from six questions used to determine teacher attitudes towards this concept. Scores in this section ranged from 3.60 to 3.89 with the statement "I feel prepared to teach integrated biological science concepts" receiving the highest rating. Three out of four respondents (75.3%) indicated they strongly agreed or agreed with this statement.

Table 1
Indiana Agricultural Science and Business Teachers' Perceptions of Teaching Integrated Science (N = 170)

Teaching Integrated Science Item	Mean	SD
I feel prepared to teach integrated biological science concepts	3.89	.86
Integrating science into the agricultural education program requires more preparation time for me than before I emphasized integrated science concepts in my agricultural education program.	3.86	.89
I teach integrated science concepts in agricultural education that focus more on the biological science concepts than the physical science concepts.	3.81	.86
I feel prepared to teach integrated physical science concepts.	3.71	.91
I have integrated more science in the advanced courses than the introductory courses that I teach in agricultural education.	3.60	1.04
Integrating science into agriculture classes has increased my ability to teach students to solve problems.	3.47	.79

Research question three asked teachers to identify perceived barriers to integrating science in their agricultural education program. Table 2 illustrates the results from the nine statements used to determine teacher opinions regarding this concept. Scores in this section ranged from 2.35 - 4.14 with the statement "the lack of a science teacher who is willing to help me integrate science concepts has been a barrier to integrating science in the agricultural education program" receiving the lowest score. Nearly three out of five teachers (59.4%) indicated they "disagreed" or "strongly disagreed" with this statement.

Table 2
Indiana Agricultural Science and Business Teachers' Perceptions of Barriers to Integrating Science into Their Agricultural Education Program (N = 170)

Barriers to Integrating Science	Mean	SD
The lack of appropriate equipment is a barrier to integrating science into the agricultural education program.	4.14	.89
The lack of adequate federal, state, or local funds is a barrier to integrating science in the agricultural education program.	3.66	1.08
The lack of agriscience in-service workshops/courses for agricultural education teachers is a barrier to integrating science into the agricultural education program.	3.31	.98
The lack of close proximity to high-technology firms is a barrier to integrating science in agricultural education programs.	3.15	.92
The lack of an integrated science curriculum is a barrier to integrating science into agricultural education programs.	3.12	.93
The lack of student preparation in science (prior to enrolling in agricultural education) is a barrier to integrating science into agricultural education programs.	3.08	1.03
The lack of science competence among teachers in agricultural education is a barrier to integrating science in agricultural education	3.02	.95
The lack of agriscience jobs in the local community is a barrier to integrating science into agricultural education programs.	2.84	1.01
The lack of a science teacher who is willing to help me integrate science concepts has been a barrier to integrating science in the agricultural education program.	2.35	.87

Research question four asked the perceptions of Agricultural Science and Business teachers towards student enrollment since integrating science into their agricultural education programs. Five statements were included in this section. Scores in this section ranged from 3.11 - 3.63 with the statement "high ability students are more likely to enroll in agricultural education courses that integrate science" receiving the highest mean score in this section. Almost two-thirds of the teachers (63.5%) responded to this statement with "agree" or "strongly agree". This section also exhibited the greatest degree of variance of any sections with all standard deviations exceeding .90. Table 3 shows the response of teachers in the area of student enrollment.

Table 3
Indiana Agricultural Science and Business Teachers' Perceptions of Student Enrollment Since Integrating Science Into Their Agricultural Education Program (N = 170)

Student Enrollment Item	Mean	SD
High ability students are more likely to enroll in agricultural education courses that integrate science.	3.63	1.06
Average ability students are more likely to enroll in agricultural education courses that integrate science.	3.45	.90
Total program enrollment in agricultural education will increase if I integrate more science into my program.	3.44	.95
Low ability students are more likely to enroll in agricultural education courses that integrate science.	3.19	1.14
Integrating science into the agricultural education program more effectively meets the needs of special population students (i.e. learning disabled).	3.11	1.00

Research question number five asked Agricultural Science and Business teachers for their perceptions regarding support of the agricultural education program since integrating science. Six statements made up this category in which teachers scored all six items with a score higher than 3.00. The statements concerned teacher perceptions of program support from school personnel, parents, and community supporters if more science were integrated into the agriculture curriculum. Table 4 illustrates the scores for this section.

The final section of the survey asked subjects to respond to two open-ended questions. The first question asked teachers what they had to "give up" or what did they feel they "had to give up" in the Agricultural Science and Business program to develop a more integrated science curriculum. Eighty-two respondents (48.2%) provided answers to this question. The most common response was preparation and/or personal time. Of those who answered the question thirty respondents (36.6%) indicated they had less time to prepare for classes and/or less personal time during their teaching day as a result of integrating or planning to integrate science into the Agricultural Science and Business curriculum. Twelve respondents (14.6%) felt they had lost or would have to give up "good farm kids" as a result of integrating science into their program. Additional items Agricultural Science and Business instructors indicated giving up as a result of integrating science comments included "FFA instruction" (8.5%), instruction in production agriculture (8.5%), and instruction in agricultural mechanization (8.5%). No other item was listed by more than 3 teachers.

Table 4
Indiana Agricultural Science and Business Teachers' Perceptions of Program Support Since Integrating Science Into Their Agricultural Education Program ($N = 170$)

Program Support Item	Mean	SD
Local administrator support will increase if I integrate more science into the Agricultural Science and Business program.	3.45	.99
School counselor support will increase if I integrate more science into the Agricultural Science and Business program.	3.45	.97
Parental support will increase if I integrate more science into the Agricultural Science and Business program.	3.35	.86
Community support will increase if I integrate more science into the Agricultural Science and Business program.	3.26	.88
Science teacher support will increase if I integrate more science into the Agricultural Science and Business program.	3.19	.99
Other teacher support will increase if I integrate more science into the Agricultural Science and Business program.	3.16	.86

A second open-ended question sought to identify the factor(s) responsible for Agricultural Science and Business teachers integrating science into their curriculum. Of the 125 responses given, teachers indicated the opportunity for students to receive science credit for successful completion of Agricultural Science and Business courses was the motivating factor more than any other listed (30.4%). Other commonly occurring responses included a general desire to better prepare kids for their future (20.0%), their programs were in need of more students (16.8%), and they wanted to gain more academic minded students (8.0%). No other item was listed by more than 4 teachers.

CONCLUSIONS/RECOMMENDATIONS/IMPLICATIONS

From the data it was concluded that many of Indiana's Agricultural Science and Business instructors have responded positively to the call for the integration of science into the agricultural education curriculum. Seventy percent of the teachers have attended a workshop on integrating science into their curriculum. As a result of their efforts, over half of the teachers reported their students receive science credit towards high school graduation after successfully completing one or more of the approved Agricultural Science and Business courses and, 40% of Indiana's Agricultural Science and Business teachers posses a science endorsement.

Indiana Agricultural Science and Business teachers agreed they felt prepared to teach integrated biological science concepts but that it required more preparation time than before they integrated scientific concepts into their agricultural education curriculum. Continued opportunities need to exist in Indiana for providing in-service and pre-service teachers with workshops on how-to integrate science into the agricultural education program to minimize the time required for providing a more science-rich curriculum. Consideration should be given to providing pre-service training for both agriculture and science teachers on the benefits of integrating science with applied science to shorten the time period needed to integrate curricula.

Teachers identified specific barriers to integrating scientific concepts into their programs as a lack of appropriate equipment, and a lack of adequate funding to support their integration efforts. It is recommended that teachers pursue extramural funding from sources such as the

ERIC

United States Department of Agriculture's Competitive Grants Program to secure funding to purchase needed equipment and supplies. In addition, the Competitive Grants Program can be used to fund in-service workshops for school personnel who desire collaborative team-building training.

Teachers disagreed that a lack of a science teacher willing to help them was a barrier to integrating science into their agricultural education program. As a result of these findings, it is recommended that Agricultural Science and Business teachers look to science teachers and their school's science departments for assistance in borrowing equipment and supplies and capitalizing on the opportunity to receive assistance in curricular planning for integrating science into the agricultural education curricula. Agricultural Science and Business teachers feel that science teachers in their building are helpful and dialogue should be opened up and maintained that would establish more effective interactions between teachers of science and agriculture.

Indiana Agricultural Science and Business teachers were unsure of the effect that integrating science had upon student enrollment in the agricultural education program. Teacher perceptions were mostly neutral to statements indicating students, regardless of ability level, were drawn to their program as a result of integrating science into the agricultural education curriculum. However, many instructors indicated the reason for integrating science into their curriculum was to boost student enrollment. Further studies should focus on the impact that integrating science into agricultural education programs has on the number and ability level of students enrolling in Agricultural Science and Business programs. Although over half of Indiana's Agricultural Science and Business teachers report their students receive credit toward graduation for the completion of one or more Agricultural Science and Business courses, further studies should be conducted to determine the feasibility of Agricultural Science and Business courses counting toward university entrance requirements.

Teachers were unsure how stakeholders would respond as a result of integrating science into the agricultural education program. Teachers neither agreed nor disagreed that administrators, counselors, parents, community members or science teachers would increase their support of the agricultural education program if they integrated more science into the curriculum. As increased attention is given to student performance on national and statewide standardized tests in core academic areas, Agricultural Science and Business teachers are encouraged to publicize their efforts to increase the science content of the local agricultural education program. Increased visibility of the academic content of Agricultural Science and Business programs has the potential of paying big dividends among stakeholder groups whose support is necessary during Indiana statewide educational reform.

REFERENCES

American Association for the Advancement of Science (1993). Project 2061-Science for all Americans. Washington, DC: Author

Caine, R. N. & Caine, G. (1994). Making connections: Teaching and the human brain. Menlo Park, CA: Addison-Wesley Publishing.

Cooperative State Research, Education, and Extension Service, U. S. Department of Agriculture (1999). Secondary Agriculture Education Challenge Grants Program. Washington D. C.: Author

National Academy of Sciences, Committee on Agricultural Education in the Secondary Schools. (1988). Understanding agriculture: New directions for education. Washington, DC: National Academy Press.

National Commission on Excellence in Education (1983). A nation at risk: The imperative for educational reform. David P. Gardner (Chair). Washington, DC: United States Department of Education.

Norris, R. J. & Briers, G. E. (1989). Perceptions of secondary agriculture science teachers toward proposed changes in agricultural curricula for Texas. Journal of Agricultural Education, 30 (1), 32-43, 59.

Roegge, C. A. & Russell, E. B. (1990). Teaching applied biology in secondary agriculture: Effects on student achievement and attitudes. Journal of Agricultural Education, 31 (1), 27-31.

Secretary's Commission on Achieving Necessary Skills, U. S. Department of Labor (1991). What work requires of schools. Washington, DC: Author.

Thompson, G. W. (1996). Characteristics and implications of integrating science in secondary agricultural education programs. Unpublished doctoral dissertation, University of Missouri-Columbia.

Waters, R. G. & Haskell, L. J. (1989). Identifying staff development needs of cooperative extension faculty using a modified Borich needs assessment model. Journal of Agricultural Education, 30 (2), 26-32.

ERIC

INTEGRATING SCIENCE IN AGRICULTURAL EDUCATION: ATTITUDES OF INDIANA AGRICULTURAL SCIENCE AND BUSINESS TEACHERS

A Critique

James E. Christiansen
Texas A&M University

Contribution and Significance of Research

This research provides insight into the attitudes and perceptions of teachers in one state about the impact of integrating science into secondary level programs of agricultural science. The manner in which the study was conducted was sound. The questions that were asked provide valuable insights. It obviously deals with a timely topic as questions have been raised in several states as to the value and suitability of considering courses in agriculture as courses of applied science. The fact that agricultural courses apply principles of science (and mathematics) has been recognized by teachers in those fields. For example, science teachers who were members of an advisory committee to the Instructional Materials Service in Texas requested that much of the material prepared for agriculture teachers be made available to use in teaching science courses.

Questions for Consideration

Thirty-nine questions were asked of agricultural science and business teachers about integrating science into the curriculum. Means were determined, standard deviations were shown, and conclusions, implications, and recommendations were developed. However, is it possible that, overall, the wrong basic questions were asked with respect to integrating science into the curriculum? For example, only one question came close to determining if teachers had or had not integrated science concepts into their curriculum. That question asked what teachers had to give up or what they felt they had to give up in order to develop a more integrated science curriculum. From the responses, one might assume that 48% of the teachers had integrated science into the curriculum. However, some teachers could have answered the question from the point of view of what they felt that they would have to give up if they had integrated science into their curriculum. Also, just because 72% of the teachers had attended a workshop on integrating science into the agricultural curriculum does not mean that they had done so. Should these two basic questions have been asked: (1) "Have you integrated science concepts into your agricultural curriculum above and beyond (addition to) those that you have traditionally taught?" (2) What were they? Then too, did the teachers know or have a common understanding as to what was meant by "science" as in integrating "science concepts" into the curriculum?

Research Question Five "...asked ... teachers for their perceptions regarding support of the agricultural education program since integrating science." Six questions were asked pertaining to that question and responses were reported in Table 4 as "...perceptions of program support since (emphasis added) integrating science into their agricultural education program (N-170)." However, two questions arise: (1) The questions were asked from a speculative point of view, i.e., "if I integrate more science," not from the point of view of those who already had integrated more scientific principles or practices into their program. (2) If all 170 people answered these questions, are the means reported accurate as it was obvious that not all of the teachers had integrated science into their curriculum? Yet, the table purports to report program support since integrating science into the program. Despite the questions raised, this discussant is glad that the study was undertaken. The authors are to be commended for doing so.

NAERC '99

Fresh Florida

Developing a Web-Based System to Address Accountability and Reporting Needs for Cooperative Extension

Rama Radhakrishna
Clemson University

Joan Pinion
Clemson University

INTRODUCTION

Accountability is not new to extension. However, its importance has become more pronounced because of stricter mandates from federal, state, local and university level legislation. According to Ladewig (1997), Cooperative Extension, like all public agencies, has seen an increased emphasis from government on program performance and accountability. The role of accountability in the budget process is certainly on the rise (Irwin, 1999) and Cooperative Extension is no exception. Accountability is defined as an implied or explicit requirement to accept responsibility for performance, progress, accomplishment, effectiveness or success of a program, activity, or project in terms of results achieved (South Carolina State Government Quality Network Association, 1998).

Accountability requirements and reporting systems at the federal level have gone through a variety of different approaches throughout the history of extension from the Extension Management Information System (EMIS) in 1970 to the National Accomplishments Reporting System (NARS) in 1982 to the Program Planning and Reporting System (PPARS) in 1992 to

ERIC

Government Performance Results Act (GPRA) in 1993. The strengths and weaknesses of each of the systems are discussed in detail in Bennett's (1996) article on National Program Information System for Extension. For example, the EMIS system that was launched in 1970 focused on national quantitative indicators such as staff time, program activities, and clientele participation. After 11 years of existence, EMIS was discontinued mainly because of widespread resistance from state extension staff due to reporting burdens, lack of usefulness of detailed national statistics, and lack of data on program results (p. 2).

Because of the shortcomings of the EMIS system, a new reporting system called National Accomplishments Reporting System (NARS) was initiated in 1982. NARS basically de-emphasized the quantitative indicators of the EMIS system and focused more on narrative reports of state program plans. As indicated by Bennett (1996), NARS provided good and valuable anecdotal information about state extension programs and results. However, national program leaders found that the narrative reports were difficult to aggregate at the national level and retrieval of NARS database was time consuming, resulting in lack of consistency among state reports (p. 2).

In 1992, extension discontinued the NARS system and initiated a new system called Program Planning and Reporting System (PPARS). PPARS was designed to document indicators for federally selected quantitative indicators. PPARS provided some quantitative generalizations about performance of nationally targeted extension programs. However, the PPARS system also had limitations. There were many discrepancies in the national PPARS database resulting in wide variations in states and regional reporting of program results. As a result, PPARS was discontinued and a new system of reporting under the Government Performance Results Act (GPRA) of 1993 was initiated. The Act specified performance goals, objectives and accomplishment indicators for extension programs, research and higher education. The first reporting of plans of work by states was submitted to CSREES in 1997. At present time, all states are required to submit their plans of work and reports under the guidelines of the new Agricultural, Research, Education, Extension and Research Act (AREERA) of 1998.

The foregoing review of reporting systems in extension indicates the complexity of the reporting systems, burden on states to comply with new systems of reporting, and developing their own reporting systems to meet state, federal and local mandates. Almost all land-grant universities, including 1890s and 1994s, have some method of reporting--DOS, electronic, Web-based, and other manual means of collecting information to comply with state and federal reporting requirements. Clemson University is no exception to this phenomenon. In the last three years, however, the reporting system for extension at Clemson University had run into several problems resulting in manual entry of data.

ERIC

PURPOSE AND OBJECTIVES

The overall purpose of the study was to describe the process of developing a Web-based system to address reporting and accountability needs in Extension. Objectives of the study were to:

1. Describe the problems associated with the old system of reporting that resulted in developing a Web-based reporting system;
2. Develop a model to describe the process of putting together a Web-based reporting system; and
3. Describe the results of testing of the new Web-based system and procedures used to implement the system on statewide basis.

METHODS AND PROCEDURES

In this section the Clemson University Cooperative Extension Service Plan of Work (POW) is briefly described. In addition, a wealth of secondary data from various sources--county offices and past records maintained relative to reporting systems were also documented. Notes maintained during the meetings, e-mail messages and letter correspondence between the computer programmer, evaluation specialist and CUMIS Coordinator also served as data sources for developing the Web-based system.

The mission of Clemson University Extension Service is to provide sound, scientifically based information to South Carolinians and to help them use that information to improve the quality of their lives. The Clemson University Extension Program goal is to help all families, individuals and communities affected by such changes and identify ways to understand and address those changes so that it will improve the quality of life of all South Carolinians.

The Clemson University Cooperative Extension Service Plan of Work is driven by base programs of the state and of the nationwide Cooperative Extension System. The plan includes broad parameters for program development and planning by university and county faculty. Extension advisory board and program identification committees also provide input to the POW (South Carolina Cooperative Extension System Plan of Work: 1997-2001, 1998).

The POW contains 15 initiatives, covering a wide variety of programs and topics that address the critical needs of South Carolina citizens. These 15 initiatives are further grouped by the five strategic goals of Public Service and Agriculture (PSA) of Clemson University which include: 1) Agrisystems Productivity and Profitability, 2) Economic and Community Development, 3) Environmental Conservation, 4) Food safety and Nutrition, and 5) Youth Development. These five PSA goals mirror the Government Performance Results Act (1993) goals developed by USDA-CSREES. Under each initiative, there are projects (70 in number) which specifically address issues relative to the initiatives and PSA/GPRA goals. See Chart 1 for details of initiatives and projects. Description of each project in the POW includes situation analysis, objectives, target audience, and accomplishment indicators.

A simple open-ended survey instrument suitable for electronic communication was developed and sent to select extension agents in various geographic locations of the state. The agents were given the URL and the guidelines for accessing the system. The intent of the questions was to get feedback, especially for the programmer to make revisions to the system. The following four open-ended questions were asked:

1) What is the average length of time taken to transmit an entry?
2) What is the maximum length of time to transmit one entry?
3) What is the duration time between clicking "Save" and when the next screen appears? and
4) How can the basic steps provided in the guidelines be improved? Responses to the open-ended questions were summarized using descriptive statistics.

FINDINGS

Objective 1: Problem Description

CUMIS (Clemson University Management Information System) on the VAX System was shutdown in July 1996, resulting in the building of a new CUMIS System.

DCIT (Division of Computing & Information Technology) at Clemson University built a new system in October 1996. There were some problems with the new system which included: 1) no mechanism for the counties and other off-campus users not already attached to the server to access CUMIS, 2) slowness of the system was very much evident, especially at the county level, and 3) county staff were very frustrated with the system because of the slowness and having trouble with saving data. Consequently, the cluster directors in a memo to the Extension Director expressed serious concern about the new system and suggested for a moratorium on using the new CUMIS System until some changes were made. These changes included: 1) revisions to rules of reporting, 2) programming base be aligned with capabilities of software on county computers, 3) the computer programmer and program evaluator visit with county staff, and 4) appropriate guidelines be developed for reporting.

A committee was appointed by the Director of Extension to look into the problems associated with CUMIS. A three-member committee consisting of the program evaluation specialist, CUMIS coordinator, and computer programmer visited two randomly selected counties in the State. The committee's task was to find a reasonable solution to CUMIS problems. The committee visited two counties and tested three different types of computers. Major problems included slowness of the system (including time taken going from one folder to another), for opening, and inputting data. Other problems included programming, network configuration, size and memory of hard drive, and the link between counties and the server. The committee made three recommendations: 1) add new computers to all county offices to increase access and speed; 2) install state-of-the art computers in each of the 14 clusters where agents and staff share computer time to report data; and 3) change the current system to manual reporting via paper (until a new electronic system is in place) by hiring a data entry person. The Director accepted the third recommendation of hiring a person to enter data for counties until a new system is developed. In November 1997 an individual was hired to manually enter the data into the system.

Objective 2: Developing a Web-based System

Figure 1 shows the sequential steps and procedures used in developing a Web-based reporting system. Each of the four steps is briefly explained in the following paragraphs.

STEP 1: The reporting of the data by paper (manual) was the beginning of developing a Web-based System. The program evaluation specialist and CUMIS coordinator visited almost all the counties in the State and offered training relative to importance of reporting, POW, accomplishment indicators, and narrative ideas for success stories. A lot of information was generated from county visits. Agents, specialists, and cluster directors provided a wealth of information and suggestions to make the system more user-friendly.

STEP 2: In step 2 key accomplishment indicators were identified. These indicators were developed based on the guidelines of federal and state reporting systems. Input from Extension specialists, county staff, and other administrators were also collected. A maximum of ten indicators was developed for each project. The first four indicators were common to all projects, while the other six indicators varied from project to project (see Chart 2). A worksheet was developed and sent to all agents at the county level and specialists to review and make suggestions. Very few changes were made to the worksheet. After receiving input from all individuals, a final version of the CUMIS User's Monthly Reporting Worksheet was developed (see Chart 3). This worksheet contained individual reporting information such as name, username, administration unit, fiscal year, month, initiative number, project number, days reported, contacts by race and gender, limited resources, and ten accomplishment indicators.

CHART 2 - ACCOMPLISHMENT INDICATORS

Accomplishment Indicators:

1. Number of activities and programs conducted in plant health (including IPM).
2. Number of participants completing educational programs.
3. Number of participants reporting increased knowledge through educational programs and activities in plant health.
4. Number of participants adopting or increasing use of plant health practices.
5. Number of mass media activities on plant health management.
6. Number of consumers visiting plant health demonstrations sites.
7. Number of youth visiting plant health demonstrations sites.
8. Number of personal contacts on plant health through telephone, office, and site visits.
9. Number of consumers receiving plant health information through the Urban Horticulture Center at Riverbanks Zoo, Home and Garden Information Center, and PAWS Horticulture Line.
10. Number of activities and programs conducted in plant health (including IPM) for youth.

A revised version of the POW with all the details relative to projects, objectives, accomplishment indicators, and worksheet was put together by the CUMIS coordinator. The POW also contained definitions and explanations for all the items included in the worksheet. In addition, the POW also contained a section, "Frequently Asked Questions" in which all the

questions that came to the CUMIS office and responses to those questions were documented for the benefit of users. A copy of the revised POW that included the new worksheet was distributed to all counties. County staff started using the new worksheet in July 1998.

STEP 3: In step three, the major focus was on developing a Web-based reporting system. Communication between the programmer, evaluation specialist, and CUMIS coordinator was critical to the development of a Web-based system in a systematic way. Information collected from county visits and other relevant information helped a great deal in conveying to the programmer the kinds of things that needed to be in the new system. In addition, the group examined in detail the plan of work, state and federal reporting guidelines, and accomplishment indicators. The programmer used the new worksheet as a model to develop the Web-based System. This group met at least eight times in the course of six months to work on the development and designing of the Web-based system. In November 1998, the Web System was ready for testing. To begin with, only campus users tested the new system. No problems were found in the new system. As a result it was decided to implement the new system by January 1, 1999 for campus faculty. A detailed guideline was developed and distributed to all campus faculty using the system. So far, the CUMIS Office has received no complaints or problems.

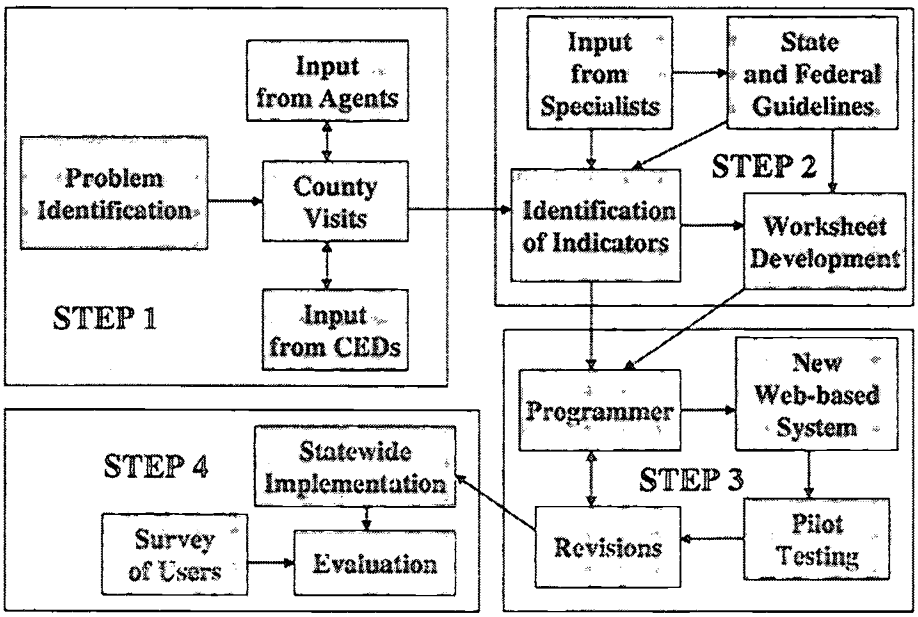


Figure 1: Sequential Steps for Developing a Web-based Reporting System

STEP 4: Since the system did not experience any problems during pilot testing or use by campus faculty, it was decided to implement the new system statewide. Before implementing, it was decided to do another test to make sure that it worked for counties as well. About 10 agents from various geographical regions of the state were selected to participate in this pilot test. The agents were given the URL and the guideline sheet for inputting data. Two weeks later the 10 agents were asked to comment on the new system. Four open-ended questions were asked via electronic communication. The intent was to get feedback, especially for the programmer to make revisions to the system. After revisions are made, the new system will be implemented for statewide use in September 1999.

BEST COPY AVAILABLE

Objective 3: Results of Pilot Test

Table 1 shows the time taken to transmit one entry under the new Web-based system. As shown in Table 1, the average time to transmit one entry was 25 seconds with a low of 7 seconds and high of 90 seconds. The maximum length of time to transmit one entry was 38 seconds. The duration time between clicking "Save" and the appearance of the next screen was 17 seconds (Table 1).

Table 1: Average Length of Time Taken for Transmitting One Entry in the New Web-based System

Question	Mean*	Range Low	Range High
What is the average length of time to transmit one entry?	25	7	90
What is the maximum length of time to transmit one entry?	38	15	120
What is the duration time between clicking "Save" and when the next screen appears?	17	5	30

* Mean calculated in seconds

Verbatim comments made by agents to open-ended question #4--How can the basic steps be improved?

1) Six minutes to log on and input 7 entries via my phone line at home. Works GREAT.

2) A UserID and password at top of screen instead of at bottom to keep scrolling to a minimum. When entering reported time, month and work location should stay until next entry. After saving a reported time entry, the screen should go back to Reported Time screen instead of Edit screen. It takes an extra click to go back to reported time.

3) Easy to make corrections. Total of 15 minutes to enter information.

4). It worked so well I thought something was wrong with the system. Reported time --cannot edit project number, month, or work location when using Edit button.

5) This is slick. It only took me less than 5 minutes to input two projects as I read your instructions for the first time and someone was talking to me as I was inputting the data. I even made errors. Errors are easily corrected by clicking reset or using the go back button. I can input data for a project within 30 seconds or less.

6) I think it is efficient and attractive. I think I am going to like the new system!

7) I made entries in six project areas for one month. It took less than 5 seconds to submit the entries. I entered all information for the month in less than 10 minutes. It seemed very easy to use.

8) Would like to see a shorter screen for the second one but understand why it must be so long. Looked for a quicker way to get to Submit button.

CONCLUSIONS AND RECOMMENDATIONS

Good accountability reporting systems are critical to extension program effectiveness. In that it contributes to better programs, better relationships with users, clients, and better working relationships with state and federal agencies.

This study has demonstrated what it takes to develop a good Web-based reporting system. This study has also demonstrated how important input from county staff is to the development of the system. Communication between counties, extension administration, and computer programmers is critical to successful development and implementation of a new reporting system.

Involving county staff in the development process has helped them to understand the importance of accountability and reporting and the use of accountability information for decision making purposes. In addition, visits to county offices have helped to eliminate concerns that county staff had about accountability and reporting. As one agent reported, "communicating with county staff and involving them in the development process has brought credibility and confidence in the reporting system." As reported by Burriss (1998) buy-in always helps to support and/or participate in the development, collection, and use of the information.

Agents who participated in the pilot test have made very positive comments about the system. Such positive comments are an indication of the efforts that went into the development of the new system. Again, as said earlier, agents' input is very critical if the system is to work smoothly. The positive comments about the system have helped in spreading the word to other agents in the counties to use the Web system.

This study has attempted to answer the question: What did you learn from what you did and how have you used what you learned to make the system better? We learned a lot from this study and have used what we learned to develop a Web-based reporting system.

Based on the findings, the following recommendations are offered:

- As reporting systems change from time to time, county staff should be made aware of the changes so that they understand the system better and report their accomplishments in a timely manner.
- It is recommended that efforts be continued to develop more user-friendly reporting systems given the complexity of extension programs in the new century.
- Further research is needed to identify areas where county staff can participate on a regular basis in the development and use of reporting systems.
- Findings of this study should be shared with extension administrators to make informed decisions about accountability and reporting systems in extension.

ERIC Full Text Provided by ERIC

REFERENCES

Bennett, C. (1996). New national program information system for Cooperative Extension: Lessons from Experience. Journal of Extension, 34(1). Available on-line at www.joe.org

Burris, S.C. (1998). Stakeholder involvement in performance measurement. Presentation made at the conference on Changing the Face of Accountability: Performance Measurement in Government. SC State Government Quality Network Association, Columbia, SC.

Irwin, D.T. (1999). A doctoral program for assessment and accountability. Assessment and Accountability Forum, 9 (1), 11-12, 18.

Ladewig, H. (1997). Demonstrating accountability through collaboration and partnerships. Paper presented at the Joint Southern Region Program Committee Meeting, Tallahassee, Florida.

South Carolina State Government Quality Network Association (1998). Measurement Development Guide. Quality Network Association, South Carolina State Government, Columbia, SC.

DEVELOPMENT OF A WEB-BASED SYSTEM TO ADDRESS ACCOUNTABILITY AND REPORTING NEEDS FOR COOPERATIVE EXTENSION

A Critique

Carl Reynolds
University of Wyoming

Faced with major accountability reporting issues plus major changes in the computer support system, the Cooperative Extension Service researchers were faced with a major task. The computerized data reporting system was causing so many problems that manual data collection was required. This study is an excellent example of the need to design a more effective system that would promote a more "user-friendly" system to accomplish a most needed data collecting system for accountability. By utilizing the expertise of extension personnel in the field, a system was developed and tested that would accomplish the main goal of the project.

The rationale for the importance and complexity of accountability for Cooperative Extension programs was well established and documented in the beginning of the paper. The frequent change in reporting systems that Cooperative Extension personnel faced within the last 7 years was overwhelming. That set of experiences combined with the change in the state university computer system, presented a serious problem with maintaining support for accountability date collecting.

The key strengths of the project included heavy involvement of the county personnel in first implementing a "quick fix", relying of the clients who had to report the data to develop a "user-friendly" system, and identifying the key accomplishment indicators as the basis for the type of data reporting needed. The steps followed in developing the Web-based system serves as an excellent model for an organization to follow in solving such a complex problem. Overall, the report was written in such a clear and detailed manner that it was easy to visualize the problem and the steps taken to design and test the solution.

In completing the pilot test of the newly designed system, the key focus of the feedback was to determine whether the 'user-friendly" goal aspect had been obtained which I agree, given the circumstances, was most critical. However, it seems natural to ask a couple of obvious questions that the report did not address. First, did the Web-based system generate the data needed for meeting the state and federal guidelines for accountability? Second, were other mechanisms for data reporting explored and should these alternatives be compared with the Web-based system?

NAERC '99

Fresh Florida

Confirming Perception: A Pretest and Posttest Evaluation of a Regional Internet Extension Inservice Training

Robert Lippert
Clemson University

Rama Radhakrishna
Clemson University

Owen Plank
University of Georgia

INTRODUCTION

One of the most recent methods of distance education to be explored is asynchronous interactive instruction exclusively via the Internet. In 1990, only a few academics had heard of the Internet but by 1997, an estimated 57 million people were using it. If the estimate includes those who used the Internet only for e-mail, the estimate increases to 71 million users (Matrix Information and Directory Services, 1997). This type of instruction is now possible in many areas because of the increasing availability of computers and Internet services in the home and workplace. Compared to other methods of distance learning such as video courses or live satellite instruction, Internet courses provide three distinct advantages: 1) Internet instruction allows for constant personal interaction between the students and instructors; 2) Internet instruction allows much greater time flexibility than a televised real-time instruction where students must meet at a designated facility for scheduled instruction; and 3) it expands resource opportunities through access to the World Wide Web and the potential to communicate with specialists throughout the world (Mayadas, 1997).

ERIC

University specialists provide research and Extension support information for county agents. Training sessions are usually offered by specialists for agents in a traditional classroom setting. The training may be offered in a one or two day session at various locations across a state and it requires the agents to be away from the office for the duration of the training.

The Internet approach to instruction has tremendous potential for agricultural Extension agent inservice training. Agents can log-on to the computer as their demanding and unpredictable schedules permit. Since agents are located throughout each state, Internet training eliminates the need for travel to a specific location in a state or region, thus saving time and money. Most county Extension offices now have or are in the process of acquiring Internet access to the World Wide Web and E-mail which makes these very attractive training tools for asynchronous distance learning.

There is a wealth of information in the literature regarding the use of the Internet for instruction of students from elementary age to the university level of instruction but very little information is offered regarding the use of the Internet for inservice training. For example, a report by Thurston and Sebastian (1996) discusses the use of multimedia materials to train rural special education personnel. They propose several models for constructing the training but have not reported the effectiveness or acceptance of implementing these models.

In the past two years, two Internet inservice trainings have been offered to county Extension agents in various states of the Southeast. For each training, an instrument was used on-line and responses were tallied and reported in Lippert, Plank, Camberato and Chastain (1998) and Lippert and Plank (1999). The instruments included questions, which focused on previous computer and Internet experience, assessment of the material presented and acceptance of using the Internet to learn the material. The agent responses were overall positive and very receptive to this form of inservice training.

Subsequently, a 3-week Internet training was offered to over 150 county Extension agents from six states (Alabama, Georgia, South Carolina, North Carolina, Florida and Virginia) for a regional training titled "Soil Acidity and Liming." Nine specialists representing these states participated in the Web development and Internet discussions. In addition to questions selected from the previously used questionnaires, a pretest and posttest was given on-line. The intent was to move beyond personal perceptions regarding the effectiveness of this form of training and use a more empirical tool for assessing the utility of Internet instruction for knowledge acquisition.

PURPOSE AND OBJECTIVES

The overall purpose of this study was to determine the usefulness of the Internet for Extension inservice training. The objectives for this training were: 1) To determine if the Internet could be successfully used for distance instruction of Extension agents with a topic covering significant theoretical concepts in addition to many practical applications; and 2) To administer both a pretest and posttest to assess the amount of actual knowledge gain as a result of the Internet training.

ERIC

METHODS, TRAINING CONTENT AND DELIVERY

A questionnaire suitable for the Internet was developed by the researchers. The questionnaire contained three sections: 1) Internet distance learning experience and participation; 2) subject matter topics containing 25 pretest and posttest questions; and 3) five open-ended questions. Questions in section one included, previous training completed on the Internet, extent of Web material read, extent of Listserv correspondence read, and the number of questions the respondent asked on the Listserv. Section two contained 25 multiple-choice questions for pretest and posttest. These 25 questions were further grouped into four topics: 1) Sources and forms of acidity; 2) Effects on plant growth; 3) Lime and assessing lime requirement; and 4) Alternate lime sources. Section three contained four open-ended questions: 1) What advantages do you see with Internet inservice training?; 2) What disadvantages do you see with Internet inservice training?; 3) Regarding information delivery, what changes would you like to see when the next inservice training is offered on the Internet?; and 4) What was the most important thing you learned as a result of this training?

Prior to offering the Internet training, several agents were randomly surveyed via E-mail and asked to suggest topics of interest as well as the preferred time of year for the training. The title "Soil Acidity and Liming" was selected in response to this informal survey. The 3-week training was held from March 22 to April 16, 1999 (with a one-week break due to many specialists traveling that week). Even though the training was scheduled for several weeks, the actual "hands-on" learning time was intended to be about 5 hours, equivalent to a day of classroom type training.

Training material was obtained from lecture notes and Extension information available from the participating states. The material was organized into a comprehensive text for instruction. The first week's topics were "Origin and Forms of Acidity", "The Effect of Soil Acidity and Liming on Crop Growth", and "The Effect of Lime Materials on the Neutralization of Aluminum". The second week's topics were "Conventional Lime Sources and Lime Quality" and "Alternative Liming Materials". The menu page for each week's training contained learning guidelines that listed the information the agents should know by the end of that section.

When the Web page was near completion, the senior training coordinator subscribed registered agents to the Listserv by using their E-mail usernames. Instructions regarding how to access the Web site and to use the Listserv were sent to the agents by E-mail. The Listserv is a means of electronic communication similar to an E-mail distribution list. All specialists and county agents were subscribed to the Listserv by the senior training coordinator. An E-mail message sent to the Listserv username went to all participants who were subscribed to this address. A reply to the Listserv likewise went back to all subscribers. The Listserv serves as a "slow motion" conversation or as an electronic "bulletin board." Access to the Listserv software was provided by the university computer center.

The URL (Web address) for the training can be found at:
http://hubcap.clemson.edu/~blpprt/acidity.html

During a two week period prior to the training, the agents were urged at four different times to take a 25 question multiple-choice pretest (see Figure 1). It was developed so they could submit their answers on-line. The questions were created to cover the key points presented on the

Web. In order to ensure that the questions were equitable, they were reviewed by the two specialists involved with the Web page development and two specialists not involved with the training. We received 121 pretest responses. At the end of training, two Listserv appeals were made for posttest and questionnaire responses. A week later county agents were E-mailed individually asking them to take the posttest. One final Listserv appeal for agents to take the posttest was made ten days after the training was completed. We received 93 posttest and questionnaire responses.

RESULTS

INTERNET DISTANCE LEARNING

Responses to Internet distance learning questions are shown in Table 1. Approximately, 29 percent of the participants reported that they had a previous training that was delivered primarily via the Internet, while 71 percent did not have previous training. A little over 75 percent (77.2%) had read the material on the Web. A similar percentage of respondents (78.9%) had read the Listserv correspondence. However, very few respondents (16%) asked questions on the Listserv. Fifty-five percent either "agreed" or "strongly agreed" that the Internet can provide a learning experience as effective as a face-to-face class, 19% either "disagreed" or "strongly disagreed", while 26% "neither agreed or disagreed" with the same statement.

Table 1: Responses to Internet Distance Learning Posttest Questions

Question	f	%
Have you ever had a previous training that was delivered primarily on the Internet? *		
Yes	35	29.2
No	85	70.8
How much of the Web material did you read?		
20%	6	6.5
40%	7	7.6
60%	8	8.6
80%	16	17.3
100%	56	60.0
How much of the Listserv correspondence did you read?		
0%	1	1.1
20%	10	10.8
40%	8	8.6
60%	12	12.9
80%	31	33.3
100%	31	33.3
How many questions did you ask on the Listserv?		
0	78	83.9
1	8	8.6
2	5	5.4
3	1	1.1
4	1	1.1
5 or more	-	-
The use of the Internet can provide a learning experience as effective as a face-to-face class;		
Strongly disagree	2	2.2
Disagree	16	17.2
Neither agree nor disagree	24	25.8
Agree	41	44.1
Strongly agree	10	11.7

* Pretest question

PRETEST AND POSTTEST

The pretest and posttest scores are shown in Table 2. The table also indicates the number and percent of correct and incorrect responses for each of the 25 questions (grouped by subject categories), percent gain in knowledge scores from pretest to posttest and significance levels for differences in pretest and posttest knowledge scores as determined by the Chi-square test.

For ease of reporting, the knowledge gain percentages between pretest and posttest were categorized into: 1) Substantial gain (30% and above); 2) Moderate gain (20-29%); 3) Little gain (10-19%); and 4) Negligible or no gain (0-9%). As shown in Table 2, knowledge scores for all the 25 questions increased from pretest to posttest. Of the 25 questions, seven showed substantial

gains (over 30%) in knowledge scores from pretest to posttest, four questions showed moderate gain (20-29%), nine showed little gain (10-19%), and five questions showed negligible or no gain (0-9%) in scores from pretest to posttest. The five questions, which showed negligible, or no gain were not statistically significant at the .05 level. Overall, the knowledge score gain from pretest to posttest ranged from a low of +1% (question 25) to a high of +43% (question 22).

Table 2: Pretest and Posttest Scores for Internet Inservice Training

Question		Pretest f	Pretest %	Posttest f	Posttest %	Difference %
Sources and Forms of Acidity						
Q1	Correct	107	88.4	92	98.9	
	Incorrect	14	11.6	1	1.1	+10.5*
Q2	Correct	60	49.6	78	83.9	
	Incorrect	61	50.4	15	16.1	+34.3**
Q3	Correct	29	24.0	38	40.9	
	Incorrect	92	76.0	55	59.1	+16.9**
Q4	Correct	82	67.8	81	87.1	
	Incorrect	39	32.2	12	12.9	+19.3**
Q5	Correct	60	49.6	53	57.0	
	Incorrect	61	50.4	40	43.0	+ 7.4 NS
Effects on Plant Growth						
Q6	Correct	102	84.3	90	96.8	
	Incorrect	19	15.7	3	3.2	+12.5*
Q7	Correct	42	34.7	60	64.5	
	Incorrect	79	65.3	33	35.5	+29.8**
Q8	Correct	30	24.8	43	46.2	
	Incorrect	91	75.2	50	53.8	+21.4**
Q9	Correct	76	62.8	80	86.0	
	Incorrect	45	37.2	13	14.0	+23.2**
Q10	Correct	94	77.7	81	87.1	
	Incorrect	27	22.3	12	12.9	+10.0 NS
Q11	Correct	36	29.8	48	51.6	
	Incorrect	85	70.2	45	48.4	+21.8**
Lime and Assessing Lime Requirement						
Q12	Correct	50	41.3	77	82.8	
	Incorrect	71	58.7	16	17.2	+41.5**
Q13	Correct	19	15.7	52	55.9	
	Incorrect	102	84.3	41	44.1	+40.2**
Q14	Correct	60	49.6	77	82.8	
	Incorrect	61	50.4	16	17.2	+33.2**

Table continued on next page

ERIC Full Text Provided by ERIC

Table 2: Pretest and Posttest Scores for Internet Inservice Training (cont'd...)

Question		Pretest f	Pretest %	Posttest f	Posttest %	Difference %
Q15	Correct	100	82.6	90	96.8	
	Incorrect	21	17.4	3	3.2	+14.2*
Q16	Correct	103	85.1	89	95.7	
	Incorrect	18	14.9	4	4.3	+10.6*
Q17	Correct	90	74.4	80	86.0	
	Incorrect	31	25.6	13	14.0	+11.6*
Q18	Correct	52	43.0	68	73.1	
	Incorrect	69	57.0	25	26.9	+30.1**
Q19	Correct	116	95.9	91	97.8	
	Incorrect	5	4.1	2	2.2	+1.9 NS
Alternate Lime Sources						
Q20	Correct	78	64.5	76	81.7	
	Incorrect	43	35.5	17	18.3	+17.2*
Q21	Correct	84	69.4	79	84.9	
	Incorrect	37	30.6	14	15.1	+15.5*
Q22	Correct	20	16.5	55	59.1	
	Incorrect	101	83.5	38	40.9	+42.6**
Q23	Correct	39	32.2	69	74.2	
	Incorrect	82	67.8	24	25.8	+42.0**
Q24	Correct	31	25.6	31	33.3	
	Incorrect	90	74.4	62	66.7	+7.7 NS
Q25	Correct	73	60.3	57	61.3	
	Incorrect	48	39.7	36	38.7	+1.0 NS

Significant at * $p < .05$; ** $p < .001$
Scale: Substantial gain (30% and above); Moderate gain (20-29%); Little gain (10-19%); Negligible or no gain (0-9%)

Findings from this training indicate that the participants had more previous knowledge of some subject matter topics than others. This is demonstrated by the percentage gain in correct answers on the pretest and posttest for the four subject matter areas. The percentage incorrect answers on the posttest for the topics "Sources of Acidity" and "Effects of Acidity on Plant Growth" were 17.7 and 19.7%, respectively. For the topics "Lime and Assessing Lime Requirement" and "Alternate Lime Sources", however, the percentage gain in correct answers for the posttest were 44.3 and 42.%, respectively. Based on the percent gain in knowledge scores between pretest and posttest, it is evident that it was possible to increase participant knowledge in these subject matter areas via the Internet training.

NATURE OF THE LISTSERV DISCUSSIONS

There is much information in the literature regarding the use of the Listserv in classroom situations and how the students adapt to it. Excellent reviews of this aspect of Listserv use are addressed by Velayo (1994) and Collins (1998). They discuss various strengths of Listserv use

such as being able to collect data, reaching a large number of diverse people easily, conversations not influenced by physical responses from others, and the ability to reflect and compose a comment at the student's own pace and convenience. Both authors support this form of electronic communication as a viable learning tool.

Typically, the literature refers to classroom situations that cannot be transferred to the inservice training approach we are presenting. For example, Williams and Merideth (1996) document student use of a Listserv to supplement class discussion but the Master's level students initially met for 32 hours the first week. The second week, they met for 19 hours and during the last four weeks, all discussion was restricted to the Internet. Thompson, Malm, Malone, Nay, Oliver and Saunders (1997) pointed out that for a graduate level class, where all discussion was confined to the Internet, about 15 weeks was required for the students to overcome Listserv phobia. An inservice training for professional adults which lasts only two or three weeks has considerations which are not addressed by studies of a semester long Internet class for university students where there may or may not be face-to-face interaction.

A tally of the saved Listserv messages showed that thirty-one agents participated in the Listserv discussions, some of them sending more than one E-mail (compared to the questionnaire responses where 15 agents said they sent a message through the Listserv). A previous training covering cotton fertility had a total of 59 E-mails sent through the Listserv. During this training, there were 168 E-mails posted on the Listserv reflecting nearly a three-fold increase. The increase was likely due to the inclusion of agents from two additional states (Virginia and Florida) and the use of a topic with wider appeal.

The E-mails from the agents mostly consisted of questions addressed to the specialists. A few agents initially sent E-mails addressed directly to one of the lead coordinators who subsequently forwarded them through the Listserv. Perhaps this was due to some slight initial Listserv phobia. Only towards the end of the training, did a few agents express personal views, which went beyond merely asking questions. These E-mails in particular were quite lengthy. Piburn and Middleton (1997) used a Listserv as a way of allowing the students to share their thoughts for a course preparing them for a career in middle school teaching. They noted that "Just as in spoken conversation, some people are quiet and others loquacious. The most talkative person posted 51 messages with [a total of] 790 lines. Another posted only one message consisting of one line of text. Some of the differences in verbosity were due to familiarity with the computer medium." This is likely applicable with the county agents as we observed later in the training. A comment by an agent, though, sums up the reluctance to communicate on the Listserv, "We are hesitant to ask dumb questions after hearing Ph.D.'s talk to one another." Perhaps students are more likely to ask questions on a Listserv than county agents who are already expected to be knowledgeable in many aspects of crop production. Romiszowski and de Haas (1989) also point out that "There are people who don't trust their thoughts in print. There will be an amount of people only reading messages and never responding."

SUMMARY OF OPEN-ENDED QUESTION RESPONSES

The questionnaire provided space for open-ended written responses to four specific questions. When asked "What advantages do you see with internet inservice training?", 59 agents replied that they could do the training at their own pace and when convenient. Some agents

replied not having to travel (14) and low expense (16). Twenty-six agents reported that the regional approach to the training was a benefit for them since, through the Listserv discussions, they could learn about agent experiences in other nearby states and have access to information from many knowledgeable specialists. Seventeen agents pointed out that they were very glad the material would remain accessible on the Web indefinitely for future reference.

Responses to the question "What disadvantages do you see with Internet inservice training?" included the ease of procrastination (18), problems with office distractions (6), lack of personal contact (12), problems with Internet access due to computer shortages or very slow modem connections (6), lack of immediate feedback to Listserv questions (4), the possibility of a more detailed discussion to questions in a face-to-face situation (5), excessive E-mails (8) and the need for other means of agent and specialist interaction so the training won't be so passive (3).

To the question, "Regarding information delivery, what changes would you like to see when the next inservice training is offered on the Internet?", 9 agents pointed out that the training would have been more convenient if scheduled in January or February when they are not so busy. Three agents suggest some way of organizing the Listserv questions and answers by topic so the discussion wouldn't seem so disjointed. Thirty-six agents volunteered such comments as "Excellent, well thought out, great format, good text and visuals, and material organization was outstanding."

The responses to the question "What was the most important thing you learned as a result of this training?" were very consistent. Eleven agents responded "Good review", Eight agents responded "the economic advantages of using lime", 16 agents responded "The causes of soil acidity" and 20 agents indicated that they most benefited from the section on types and properties of alternative liming materials.

CONCLUSIONS AND RECOMMENDATIONS

The pretest and posttest results clearly show the effectiveness of the Internet for actual knowledge acquisition of a theoretical and applied agricultural topic. As found in previous Internet trainings, there is a general acceptance for this style of learning. A majority of the agents (55%) thought that training offered through the Internet can be as effective as a face-to-face learning environment.

During the assessment of this data, questions have surfaced regarding the influence of the county agents' background and learning style on their ability to do well with Internet distance education. As a future research investigation the next training will incorporate a learning style test, in addition to a pretest and posttest, to assess the correlation between the agent's personal style of learning and their ability to learn with an Internet training. We will also study the relationship between their test performance and various demographics such as age, level of education, sex, etc. Future training sessions will also utilize more interactive tools such as video clips and intermittent self-grading mini-tests so the agents can monitor their own progress as they read through the material.

Future inservice training will incorporate suggestions made by the agents relative to information delivery, topics, time of training, etc.

Findings from this study will be shared with Extension Staff Development to help them make informed decisions for offering future inservice training through distance learning.

Figure 1: Questions Used for the Pretest and Posttest

1. Rainfall in excess of evaporation removes primarily ____ from the soil.
2. In general, when comparing dicots to monocots, the pounds per ton of crop removal of soil calcium is:
3. Sources of acidic hydrogen in the soil do not include:
4. Which of the following creates the most soil acidity per pound of N?
5. Active acidity refers to:
6. The two main effects of acidity on plant growth are:
7. The single most important factor affecting Ca and Mg availability in acid soils is:
8. Mechanisms of phosphorus deficiency in acid soils do not include:
9. All the following micronutrients become less plant available as the soil pH increases except:
10. In acid soils, legumes often show N deficiency symptoms because:
11. Nitrification is optimal in the pH range of:
12. The main benefit of lime on crop growth is:
13. The buffer solution that was developed to determine the lime requirement for soils containing primarily kaolinitic clays having a low CEC is:
14. The material used as the standard by which the acid neutralizing capability of all other liming materials is measured is:
15. The two principal factors which influence aglime quality is its acid neutralizing capacity and:
16. The acid neutralizing capacity of lime is usually measured as the:
17. Among the following materials, which has the highest CCE?
18. A liming material has a CCE greater than 120. It probably has an appreciable amount of:
19. The particle size of ground agricultural limestone is measured by:
20. Hydrated lime is all of the following except:
21. Boiler ash ...(various properties given as possible responses to complete the sentence):
22. Flue dust ...(various properties given as possible responses to complete the sentence):
23. Paper mill lime is not commonly used for agricultural purposes because of its:
24. The most abundant element in wood ash is:
25. The major constraints to land application of wood ash do not include:

ERIC

REFERENCES

Collins, M. (1998). The use of e-mail and electronic bulletin boards in college-level biology. Journal of Computers in Mathematics and Science Teaching, 17(1), 75-94.

Lippert, R.M. & Plank, C.O. (1999). Responses to a first time use of internet inservice training by agricultural Extension agents. Journal of Natural Resources and Life Sciences Education (in press).

Lippert, R.M., Plank, C., Camberato, J. & Chastain, J. (1998). Regional Extension in-service training via the internet. Journal of Extension. 36(1), Available on-line at www.joe.org.

Matrix Information and Directory Services. (1997 January). www.mids.org.

Mayadas, F. 1997. Asynchronous learning networks: A Sloan Foundation perspective. Journal of Asynchronous Learning Networks. 1(1):3-6.

Piburn, M.D. & Middleton, J.A. (1997). Listserv as journal: computer-based reflection in a program for pre-service mathematics and science teachers. Paper presented at the International Conference on Science, Mathematics and Technology Education. Hanoi, Vietnam.

Romiszowski, A.J & de Haas, J.A. (1989). Computer mediated communication for instruction: using e-mail as a seminar. Educational Technology. 7-14.

Thompson, J.C., Malm, L.D., Malone, B.G., Nay, F.W., Oliver, B.E. & Saunders, N.G. (1997 October). Enhancing classroom interaction in distance education utilizing the world wide web. Paper presented at the annual meeting of the Mid-Western Educational Research Association. Chicago, Illinois.

Thurston, L.P. and Sebastian, J. (1996). Technology and rural special education: models and methods for preparing teachers. *In* Rural Goals 2000: Building Programs That Work. 242-250.

Velayo, R.S. (1994). Supplementary classroom instruction via computer conferencing. Educational Technology. 20-26.

Williams, H.L. & Merideth, E.M. (1996). On-line communication patterns of novice Internet users. Computers in the Schools. 12(3). 21-31.

CONFIRMING PERCEPTION: A PRETEST AND POSTTEST EVALUATION OF A REGIONAL INTERNET EXTENSION INSERVICE TRAINING:

A Critique

Carl Reynolds
University of Wyoming

Conducting research on the use of the Internet to deliver in-service education is a most needed and timely topic. It is interesting to note that ten years ago, those institutions that ventured into various forms of distance learning were considered to lose prestige by doing so. Now, with the popularity of email, asynchronous electronic communication, and the Internet, almost every institution is "in the game". This report has implications for multi-state cooperative in-service delivery as well as the findings from the evaluation of an Internet-delivered in-service activity.

The argument for delivering in-service on the Internet is well established. Limited budgets for travel, time commitments, scheduling conflicts, and, in some parts of the country, distance required to travel all play a part for the convenience an Internet course.

The web site is an excellent resource for anyone needing soil pH and its effect on nutrient levels needed for ideal plant growth. The information is concise and well illustrated with colorful graphs and charts. The organization is logical and easy to follow. The appropriate use of navigational links is straightforward and easy to follow. Slow downloading did occur when in remote locations and accessing the site through the use of a phone modem. Although not asynchronous, the researchers established an email listserve to facilitate interaction.

Although I am not sure that the use of the pretest-posttest results are attributable to only the influence of the Internet-delivered course, I was most interested in the responses to the open ended questions. The agents' responses indicated they would prefer more training delivered in this fashion. It was important to note that they offered valuable suggestions for improving the discussion medium to better organize the discussions. These comments make a most valid point. Those who plan to deliver a course or in-service program must pay close attention to instructional design and the process of learning and not just focus primarily on the subject matter. These issues may explain why the number of those engaging in discussions on the listserve may have been so small. For example, if a researcher were to go to a large class conducted in a lecture hall where the instruction is face-to face, the interaction of learners would be a small percentage as well.

Some questions come to mind with regard to the delivery of the in-service training, Why was the listserve used as opposed to asynchronous conferencing software? Would more agents have supported the conferencing approach? What model of electronic distance delivery will be most effective for clients who have conflicts with time schedules and contribute voluntarily as opposed to those who enroll in a course for grade? Granted, these questions ask for speculation but the implications for further research suggest that much more needs to be done.

ERIC

NAERC '99

Research Fresh from Florida

Perceptions of the Louisiana Legislature Toward the Louisiana Cooperative Extension Service

Pamela Hodson
Louisiana Cooperative
Extension Service

Joe Kotrlik
Louisiana State University

INTRODUCTION

The Cooperative Extension Service (CES) is an integral part of the higher education system of land-grant colleges and universities. Like colleges and universities, the CES depends upon its legislature for funding. Over the years the CES has met head-on the challenge of working with people to identify problems and opportunities, adapt to societal change, and serve the needs of its clientele. The Land-Grant College System is more viable and dynamic in its research, instruction, and extension today than it has ever been. This must continue if it is to maintain efficient and effective educational programs for the people.

Extension programs are financed cooperatively from federal, state, and county sources. The current national distribution pattern reflects federal support of approximately 40%, state support of about 40%, county support of 18% and 2% is derived from non-tax sources (Cooperative State Research, Education and Extension Service, 1996). Federal appropriations in Louisiana accounted for 30% of the overall 1996 budget, while 69% was from state appropriations, 0.4% from county appropriations, and 0.6% from non-tax sources (Louisiana State Legislature, 1996).

Members of the Louisiana Legislature were identified for this study because current and future programs of the CES are directly affected by the legislators' perceptions of the CES. Laws enacted by the Legislature control the destiny, prosperity, and general well-being of individuals as well as organizations such as the Louisiana CES. Since members of the Legislature are formal

ERIC

legitimizers for the CES and are usually perceived as key influentials within their respective districts, it is important to the CES and its clientele that the legislators have an understanding of Extension programs and activities.

John Paluszek, CEO of Ketcham Public Affairs in New York, was retained by the Cooperative Extension Service and Cooperative State Research Service to study the Extension Service and Experiment Stations. In his report, Paluszek states, "the Cooperative Extension Service is swimming against some very strong currents. Federal funds are being redirected and state and local funds are under unprecedented pressure." According to Paluszek, the CES has done well on performance but needs to significantly communicate an awareness of the programs, how those programs can be accessed by customers and the benefits those programs provide to individuals and to communities (Institute of Food and Agricultural Sciences, 1995).

Wahlke, Eulaw, Buchanan and Ferguson (1962) conducted and reported one of the most comprehensive, certainly one of the most respected, studies of the American legislative system at the state level. Their study focused on the perceptions and behavior of the men and women in four state legislatures. In examining the political careers of these legislators, the researchers found that certain information sources guided the perceptions and attitudes of the legislators. According to Wahlke et al.:

> Legislators do not respond to expectations from whatever source as incumbents of a particular kind of public office alone but in terms of qualities and characteristics which define them as human beings. How they respond and why they respond as they do are questions influenced by the whole sequence of their prior experiences, attitudes and predispositions; their current perspectives and goals; and by their anticipation of the future (p. 7).

Dugas (1994) studied the voting records of the members of the 1992 Louisiana Legislature as these records related to support for higher education. To accomplish this, Dugas collected data on the roll calls on bills on higher education and related them to personal characteristics of legislators. Dugas concluded that legislative support for higher education is reasonably predicted by studying personal characteristics of the legislators, which included race, gender, education, age, occupation, legislative experience, party affiliation, committee membership, legislative committee leadership and number of bills introduced (Dugas, 1994).

Miller (1988) sought to determine the perceptions of the South Carolina Legislature with regard to the Clemson University Cooperative Extension Service. Miller identified four areas where perception was to be determined: purpose and objectives, participation and involvement, basic program areas, and clientele of the CES. He attempted to associate this perception with selected factors: role in the legislature, years of legislative experience, political party affiliation, place of residence, character of district, age, and occupation. A mailed questionnaire was used to collect data from 65% of the 1985 South Carolina Legislature. Legislators perceived the Clemson University Cooperative Extension Service as a rural, agriculturally-oriented organization. Each of the selected factors was associated significantly with at least one or more aspects of perception. Miller found that party affiliation, place of residence, and character of the district exerted the greatest influence on how the legislators perceived the Clemson University Cooperative Extension Service (Miller, 1988).

Curtis (1978) conducted a study similar to the research done by Miller to determine Alabama legislators' perception of the Alabama Cooperative Extension Service. Curtis (1978) found that the respondents had a low level of understanding of the major purposes of the CES and a low level of participation in extension activities. The findings showed that the respondents

ERIC

were more familiar with major program thrusts of the CES in agriculture and 4-H youth, and ranked these as the two most important areas of work. The study also noted that respondents who received reports on work and accomplishments of the CES did not have a higher degree of perception (Curtis, 1978).

A comparison of the perceptions of Texas legislators, their legislative staff members, and of registered lobbyists in Texas concerning sources of information on animal agriculture issues was the focus of a study by Schlink (1996). Providing information to legislators concerning agricultural issues was deemed essential. The study also concluded that lobbyists are effective in influencing legislation regarding agricultural issues and the same methods used to inform legislators can be used to inform and influence lobbyists. Conversely, working with a specific legislative aide in order to influence a specific legislator was seen as most effective for lobbyists (Schlink, 1996).

Walker (1977) found that the legislators' places of residence had a direct relationship with their familiarity with the overall CES program. Legislators with farm related occupations and committee assignments were more familiar with the total CES program than legislators with non-farm related occupations and committee assignments. Even though these groups knew more about the CES, this did not appear to influence participation in CES activities. All legislators perceived 4-H and youth development as an important area of work. Even though some legislators knew more about the overall CES program, they did not participate at a higher level than those who knew less (Walker, 1977).

In this era of increased accountability and limited resources, decision makers are asking tougher questions about continued funding for public programs. It is everyone's job within the organization to clearly describe what they do. Staff must be able to articulate, in terms that matter to the public, what difference the organization makes and what are the outcomes and impacts. Planning and coordination of these educational and advocacy efforts must occur at the organizational level. As individuals and organizations build their relationship marketing capacity, and develop consistent contact with important decision makers, the ability to positively impact key policy and funding decisions will be enhanced (Hemmingsen, 1996). Kotler & Fox (1985), in their book on institutional strategic marketing, point out that only by fulfilling the needs of customers can an institution or business effectively market itself (Kotler & Fox, 1985).

In developing, maintaining and enhancing relationships with elected officials, extension service staff must employ "high touch and personalized technology" communications strategies. By using imagination to portray the extension service's commitment and ability to address important community issues, the extension service's future will be secure (DeYoung, 1988).

ERIC

STATEMENT OF THE PROBLEM

The literature documents the fact that legislators have perceptions, whether good or bad, of government agencies such as the Cooperative Extension Service. The literature has also shown that these perceptions can and do have a very real impact on government programs and this relationship is critical to CES. Since its beginning, the Louisiana Cooperative Extension Service has been oriented toward the agricultural sector of the state. Since its clientele has been largely concentrated on farms and in rural areas, the Louisiana CES is concerned about the support that a more urban legislature will give its requests for appropriations as it restructures its programs to meet the needs of citizens from both urban and rural areas of the state.

Prior to this study, no current information existed on the image of the Louisiana Cooperative Extension Service as perceived by members of the Legislature, or on the factors that affect their perceived image of the CES. This information can be useful in evaluating the marketing efforts currently underway within the CES and in modifying the marketing program as appropriate based on legislators' perceptions.

PURPOSE AND OBJECTIVES

The purpose of the study was to determine the perceptions of the Louisiana Legislature toward the Cooperative Extension Service (CES). The objectives were to: 1) Describe the demographic characteristics of the legislators, 2) determine legislators' levels of familiarity with CES programs, 3) determine the effectiveness of CES programs as perceived by legislators, 4) determine sources of information about CES used by legislators, 5) determine the amount of participation in CES programs by legislators, 6) determine if differences existed in legislators' perceptions of the effectiveness of CES programs by selected variables, 7) determine if relationships existed between perceptions of effectiveness of CES programs and selected variables, and 8) determine if selected variables explained a significant proportion of the variance in the legislators' perceptions of the effectiveness of CES programs.

PROCEDURE

The population included members of the Louisiana Legislature over time and the members of the 1997 Louisiana Legislature were considered to be a representative sample. Personal data, such as gender, race, and age, party affiliation, and committee assignments, was collected on each legislator from the Public Affairs Research Council, the Louisiana Legislature home page, and the Department of Elections and Voter Registration. The survey data were collected by CES faculty who were located in counties corresponding with the legislators' districts. Of the 144 legislators, 109 surveys (76%) were returned.

The goal of this research was to determine the perception of the CES held by members of the Legislature. In considering an appropriate method of investigation, the survey method was selected. Kerlinger (1986) stated that responses to mail questionnaires are generally poor. Returns of less than 40 to 50 percent are common. Since a higher return rate was desired, and the survey involved a population that might not yield a high response rate if a mail survey alone was used, the personal survey method was chosen (Kerlinger, 1986).

Use of a standardized instrument that would support the study was considered desirable. However, no instrument could be located which would meet the requirements of the study. It was therefore necessary to construct a survey instrument that would be adequate to elicit the required

information. The instrument contained the following sections: questions eliciting demographic information not provided in the Public Affairs Research Council (PAR) reference, questions eliciting information on legislators' familiarity with CES programs, questions eliciting information on legislators' perceptions of the effectiveness of CES programs, questions eliciting information on sources from which legislators gained information on CES programs, and questions eliciting information on legislators' participation in CES programs. The instrument's content validity was assessed by four university faculty members, the Director and Assistant Director of the Cooperative Extension Service. The validation panel recommended minor changes in the survey instrument, which were incorporated into the survey instrument. To further test the validity of the instrument, ten former members of the Legislature were faxed a copy of the survey instrument. Seven of the former legislators returned the survey. Several suggested minor changes in the survey instrument and these changes were incorporated into the survey instrument. In the study, the internal consistency for the four scales in the instrument ranged from .76 to .95 using Cronbach's alpha.

Procedures recommended by Dillman (1994) were used in collecting data. CES agents were asked to collect information from assigned legislators based on location of the legislators' districts as it corresponded to where the agent was employed. A letter from the CES Director explaining the purpose of the project was mailed to all participating CES county chairmen; other material in this mailing included: copies of the survey instrument, general information about the survey, a copy of the letter to be given to legislators prior to the interview, and names, addresses and phone numbers of those legislators to be interviewed. County chairmen assigned agents on their staff (including the county chairmen) to conduct the surveys and agents were instructed to meet with legislators. They were asked not to discuss or explain CES programs prior to, or during, completion of the survey by the legislator. The survey was to be completed by the legislator without any input from the extension agent. The completed questionnaire was placed in a stamped return envelope, sealed and given back to the extension agent. To protect the confidentiality of the survey responses, the completed surveys were mailed to a university faculty member who was not a CES employee, who removed the identification number from the survey before the data were coded into tabular form.

In some cases, extension agents were not successful in making an appointment with the legislator. In these cases, the survey was left at the legislator's office or sent to the legislator's office. In a few other cases, the legislator was unable to complete the survey while the agent was present, so the legislator completed and mailed the survey later.

Follow-up data collection efforts included reminder letters to county agents from the Director of Extension, phone calls by the authors to county chairmen, and a letter to all non-responding legislators. Confounding variables were controlled through the use of instructions prepared by the researcher.

Significant differences existed in the scale means for the four primary variables (scale means) by response wave. Although some would argue that a 76% response rate is fairly high, the differences by wave were so substantial that it was concluded that the responses did not represent the entire population of legislators. Therefore, all findings and conclusions reported in this manuscript apply only to the population of legislators over time who are likely to respond to a survey addressing the effectiveness of the Cooperative Extension Service after repeated data collection efforts.

Descriptive statistics were used to describe the personal characteristics of respondents. Analysis of variance and t-tests were used to determine if there were significant differences in

legislators' familiarity with CES programs, perceptions of effectiveness of CES programs, exposure to CES information, and participation in CES activities by selected characteristics. Pearson's correlation coefficients were calculated between selected characteristics and legislators' familiarity with CES programs, perception of effectiveness of CES programs, exposure to CES information sources, and participation in CES activities. Stepwise regression was used to determine if selected variables explained a significant portion of the variance in familiarity with CES programs, perception of effectiveness of CES programs, exposure to CES information sources and participation in CES activities. The alpha level was set a' priori' at .05.

FINDINGS

Objective 1: Demographic Characteristics. Due to space limitations, full tables containing complete data regarding the demographic characteristics of the respondents will not be presented. This information is available and will be provided if requested. Ninety-eight male (89.9%) and 11 female (10.1%) legislators participated in the study. Ninety-seven were white (89.0%) and 12 were black (11.0%). The average age of members who participated in the study was 50 years (M=50.34), and 44 had less than five years of service in the Legislature. House members averaged 7.64 years of service (SD=7.11) while Senate members averaged 10.04 years of service (SD=9.07). One-fourth of the Senators (7 or 25.0%) and over one-fourth of the House members (23 or 28.4%) described their districts as rural; four senators (14.3%) and seven representatives (9.9%) described their districts as urban.

Twenty-eight legislators (25.7%) listed their occupations as attorney and 16 (14.7%) were employed in real estate/insurance. Agribusiness, which included farming, was the occupation cited by 12 (11.1%)of the legislators. The remaining legislators were distributed over a number of other fields. The dominant party affiliation in both Houses was Democrat (18 or 64.3% in the Senate, 59 or 72.8% in the House).

Objective 2: Familiarity with CES. The legislators who responded to the survey (Table 1) indicated that they were familiar with CES. Responses were recorded on a five-point scale ranging from 1 (unfamiliar) to 5 (very familiar). The 4-H program received the highest familiarity score for a CES program, agriculture programs ranked next, and home economics ranked third, followed by community and agricultural leadership development.

Table 1

Legislators' Familiarity with CES and CES Programs

Program area	Familiarity		
	N	M	SD
Cooperative Extension Service	108	3.85	1.08
4-H youth programs	108	3.65	1.12
Agricultural programs (county agents)	108	3.56	1.31
Home economics programs	108	3.22	1.22
Community and agricultural leadership development	108	3.01	1.38
Fisheries programs	108	2.88	1.34
Expanded food and nutrition programs (EFNEP)	108	2.65	1.28
Grand mean		3.26	1.25

Note. 1=unfamiliar, 2=slightly familiar, 3=familiar, 4=somewhat familiar, 5=very familiar

Objective 3: Effectiveness of CES Programs. Table 2 shows that the agriculture and 4-H programs were perceived as very effective by the legislators; home economics, community development and leadership, fisheries, and EFNEP (Expanded Food and Nutrition Program) were perceived as effective. Responses were recorded on a six-point scale ranging from 0 (not familiar) to 5 (extremely effective).

Table 2

Perceptions of the Effectiveness of Selected CES Programs Held by Legislators

Program area	Program effectiveness		
	N	M	SD
4-H youth programs	92	4.12	0.68
Agricultural programs (county agents)	90	4.06	0.75
Home economics programs	79	3.76	0.87
Community and agricultural leadership development	72	3.63	0.88
Fisheries programs	68	3.57	0.94
Expanded Food and Nutrition Programs (EFNEP)	57	3.54	1.02
Grand mean		3.78	0.89

Note. N does not include "Not familiar" responses and "Not familiar" responses were not included in the M score for the perception of effectiveness of CES programs. Scale: 1=effective, 2=slightly effective, 3= effective, 4=very effective.

Objective 4: Sources of Information. The legislators who responded to the survey indicated that printed information, personal contacts, newsletters and newspaper articles provided moderate exposure to CES (Table 3). Responses were recorded on a five-point scale ranging from 1 (no exposure) to 5 (very frequent exposure). Other sources of CES information that

provided some exposure were attendance at CES programs, family experiences, contact with legislative aides, radio, phone calls to CES, visits to local CES offices, personal contacts, television, newspaper articles and constituent contacts. The Agricultural Center video provided very little exposure.

Table 3

Sources of Information that have Informed Legislators about CES

Information source	Exposure level		
	N	M	SD
Printed information	109	3.48	1.27
Personal contacts	109	3.41	1.41
Newsletters	107	3.38	1.26
Newspaper articles	108	3.26	1.29
Attendance at CES programs	108	2.94	1.23
Family experiences	109	2.82	1.38
Radio	109	2.61	1.21
Phone calls to CES	109	2.52	1.25
Visits to local CES offices	108	2.45	1.26
Constituent groups	109	2.38	1.19
Television	108	2.38	1.21
Agricultural Center video, "Taking the University to the People"	109	1.61	1.01
Grand mean	109	2.77	1.25

Objective 5: Participation in CES Programs. Table 4 shows that a majority of the legislators had attended at least one 4-H youth development activity, especially 4-H livestock shows. Community resource development meetings and county advisory committee meetings were attended by 36 (33%) of the 109 legislators responding to the study. Only 11 (10%) of the legislators had attended a home economics workshop.

Table 4

Participation by Legislators in CES Programs

Program area	Number/percent participating								
	Senate			House			Legislature		
	Yes (#)	No (#)	Yes (%)	Yes (#)	No (#)	Yes (%)	Yes (#)	No (#)	Yes (%)
4-H livestock shows	15	13	53	42	39	52	57	52	52
4-H youth development activities	10	18	35	45	36	56	55	54	50
County advisory committees	11	17	39	25	56	31	36	73	33
Experiment Station field days	9	19	32	25	56	31	34	75	31
Community resource development meetings	7	21	25	24	57	30	31	78	28
Agricultural marketing meetings	7	21	25	18	63	22	25	84	23
Agricultural production meetings	9	19	32	15	66	18	24	85	22
Mall exhibits	7	21	25	17	64	21	24	85	22
Horticulture/gardening programs	6	22	21	17	64	21	23	86	21
Fisheries programs	7	21	25	12	69	15	19	90	17
Leadership seminars	5	23	17	11	70	14	16	93	15
Home economics workshops	1	27	3	10	71	12	11	98	10
Total	38	102	37	95	310	31	143	412	35

Objective 6: Differences in Perceptions of Effectiveness of CES Programs by Selected Variables. Inferential t-tests and analyses of variance were used to analyze the data for this objective. The analysis revealed that Democrats (M=3.69) and members of the Agriculture Committees (M=4.27) perceived CES as more effective than Republicans (M=3.59) and those who were not on the Agriculture Committees (M=3.66). Urban (populations over 49,999) legislators' perceptions of effectiveness were significantly lower (M=2.21) than for those living in small cities (population 10,000-49,999, M=2.44), those living on a farm (M=2.94), those living in rural areas but not on a farm (M=3.02), and those living in small towns (population less than 10,000, M=3.44). No significant differences existed in legislators' perceptions of the effectiveness of CES programs by occupation.

Objective 7: Relationships Between Perceptions of Effectiveness of CES Programs and Selected Variables. Correlation coefficients were calculated between age of the legislators and their years of service, and their perceptions of the effectiveness of CES programs. Using the conservative set of descriptors proposed by Hinkle, Wiersma and Jurs (1979), little, if any, correlation existed.

Correlation coefficients between legislators' familiarity with CES programs and legislators' perception of effectiveness of CES programs showed that legislators' familiarity levels with extension agriculture, home economics, leadership and fisheries programs were moderately correlated with legislators' perceptions of effectiveness, while 4-H, youth and EFNEP programs had low correlations with their perceptions of effectiveness. The data also revealed a positive relationship between phone calls to CES offices, personal contacts, family experience,

contact with legislative aides, printed information, visits to local CES offices, attendance at CES programs and constituent group contacts with legislators' perception of the effectiveness of CES programs.

Objective 8: Explanation of Variance in Legislators' Perceptions of Effectiveness of CES Programs. Stepwise regression analysis was used to determine if selected variables explained a significant proportion of the variance in the legislators' perceptions of effectiveness of CES programs. Agriculture Committee membership was the best predictor of legislators' perception of effectiveness of CES programs, explaining 12% of the variance. Other variables that explained an additional 11% of the variance were: years in the House, and years in the Senate.

CONCLUSIONS

Most Louisiana legislators are white, male Democrats between 40 and 60 years old, and they have served in the Legislature for less than eight years. They represent districts that are either rural or partially rural and they are likely to be an attorney, in general business, in real estate/insurance, or agribusiness. The legislators are familiar with CES and are most familiar with the 4-H, agriculture, and home economics programs.

Overall, Louisiana Legislators perceive that CES programs are effective. The agriculture and 4-H programs are perceived as very effective by the legislators and home economics, community development and leadership, fisheries and EFNEP are perceived as effective. Printed information is the most effective information source that informs legislators about the CES. Personal contacts, newsletters, and newspaper articles are effective tools for informing legislators about CES. Legislators participate in a wide variety of CES programs, with strongest participation in 4-H youth and livestock show programs.

Democrats and members of the Agriculture Committees, perceive CES programs as more effective than Republicans and those legislators not on the Agriculture Committees. Legislators whose district descriptions are rural/suburban, rural/urban, and rural perceive CES as more effective than legislators whose district descriptions are urban and suburban/urban. No differences exist in legislators' perceptions of the effectiveness of CES programs by legislators' occupations.

No relationship exists between legislators' age and years of service and their perception of effectiveness of CES programs. A moderate relationship exists between legislators' familiarity with agriculture, fisheries, home economics, and leadership programs and legislators' perceptions of the effectiveness of CES programs. Low relationships exist between legislators' familiarity with 4-H youth programs and EFNEP and legislators' perceptions of the effectiveness of CES programs. Agriculture Committee membership is the best predictor of legislators' perceptions of effectiveness of CES programs. Other variables explaining additional variance include: years in the House, and years in the Senate.

In summary, legislators are familiar with CES and perceive that CES is an effective organization. Legislators are not adequately familiar with all aspects of the CES. In addition, urban and Republican have less favorable opinions of the effectiveness of CES program than other legislators. This appears to be explained by their lower levels of familiarity with these programs. It appears that the information dissemination tools utilized by CES, as indicated by the sources of information used by legislators, may not be adequate to education urban and Republican legislators about CES programs.

ERIC Full Text Provided by ERIC

RECOMMENDATIONS

The Louisiana CES should initiate a program designed to strengthen and improve the image of the CES held by legislators. An effort must be made to help all legislators, both rural and urban, and Democrat and Republican, understand the mission and programs of CES, with special emphasis on urban and Republican legislators. CES staff must continue to invite legislators to attend and participate in programs and activities to gain first-hand information about CES. There needs to be a greater use of printed information and personal contacts as a means of improving communications with legislators.

The legislators' responses indicated that party affiliation and membership on Agriculture Committees were related to perceptions of CES. The influence produced by these variables should be kept in mind in planning and developing new programs. CES staff should be encouraged to maintain personal contacts with legislators and contacts with legislative aides. Legislators should be specifically invited to visit CES offices and to participate in CES programs.

Recommendations for further study. Additional research should be conducted to determine what patterns of legislative contacts are appropriate to maintain adequate levels of familiarity with CES programs. Research should also be conducted to determine if correlations exist between legislators' perceptions of the effectiveness of CES programs, and legislators' votes on issues specifically affecting CES and/or CES programs.

The Internet has revolutionized the types and amount of information that is instantly available to the public. A study should be conducted of the impact this delivery mode has on legislators' support of CES programs.

With budget pressures increasing, more emphasis on local funding of CES programs is likely. Studies should be conducted of local officials' familiarity with and perceptions of effectiveness of CES programs. Such studies could be "localized" by city, county, groups of counties, or cropping areas. Research should also be conducted to determine the elements (content, timing, personalities, pictures, action, etc.) of stories on CES programs that gain the attention of members of the news media, selected sub-groups of the general public, and public officials. The Agricultural Center should investigate ways to more effectively expose legislators to the Agricultural Center video, "Taking the University to the People."

ERIC Full Text Provided by ERIC

REFERENCES

Cooperative State Research, Education, and Extension Service. (1996). Urban extension: A national agenda. Washington, D.C.: Author.

Curtis, W. W. (1978). A study of the Alabama legislators' perceptions of the Alabama Cooperative Extension Service. (R & T Summary - No. 89). Baton Rouge: Louisiana State University.

DeYoung, B. (1988). What's relationship marketing?. Journal of Extension, 26, 8 - 10.

Dillman, D. A. (1994). How to conduct your own survey. New York: John Wiley & Sons, Inc.

Dugas, S. B., (1994). Support for higher education in the 1992-1993 Louisiana legislature. Unpublished doctoral dissertation. Baton Rouge: Louisiana State University.

Hemmingsen, R.A. (1996). Impacting decisions makers (1st ed.) [Brochure]. St. Paul: University of Minnesota Extension Division.

Hinkle, D. C., Wiersma, W., & Jurs, S. G. (1979). Applied statistics for the behavioral sciences. Chicago, Illinois: Rand McNally College Publishing.

Institute of Food and Agricultural Sciences (1995). External relations manual for public accountability. Gainesville, Florida: Author.

Kerlinger, F. N. (1986). Foundations of behavioral research. New York, New York: Hold, Rinehart & Winston.

Kotler, P. & Fox, K. F. (1985). Strategic marketing for educational institutions. Trenton, New Jersey: Prentice-Hall, Inc.

Legislature of the State of Louisiana. (1996). Louisiana state budget for fiscal year 1996. Baton Rouge, Louisiana: Author.

Miller, J. C. (1988). Perceptions of the Clemson University Cooperative Extension Service. Unpublished doctoral dissertation. Clemson, South Carolina: Clemson University.

Public Affairs Research Council of Louisiana, Inc. (1997). Citizens' guide to the 1996 Louisiana Legislature addendum. Baton Rouge, Louisiana: Author.

Schlink, S. M. (1996). Analysis of perceptions of registered lobbyists, legislative aides, and legislators toward information exchange about animal agriculture issues. Unpublished doctoral dissertation. College Station: Texas A & M University.

Walker, K. (1977). Attitudes and perceptions of the Louisiana Legislature (1977) concerning the Louisiana Cooperative Extension Service. Unpublished doctoral dissertation. Baton Rouge: Louisiana State University.

Wahlke, J., Eulaw, H., Buchanan, W., and Ferguson, L. (1962). The legislative system. New York, New York: John Wiley & Sons.

ERIC

PERCEPTIONS OF THE LOUISIANA LEGISLATURE TOWARD THE LOUISIANA COOPERATIVE EXTENSION SERVICE

A Critique

Carl Reynolds
University of Wyoming

Opinions held by policy makers on public services are becoming increasingly important as more and more funding sources are shifted from federal to state and local sources. And, if these services are to be maintained, increased responsibilities lie with personnel of public services such as the Cooperative Extension Service (CES) to be made aware of perceptions held by state legislators. In addition, successful practices to increase awareness by legislators of the services provided by the CES need to be identified and shared in order to improve legislators' knowledge and support of the CES. This research report serves as a good example of what may become useful in other states as well as in Louisiana.

The case for determining the image of the CES by policymakers is well presented in the beginning of the paper. It was noteworthy as well that the case for personal characteristics and past experiences of legislators as well as being informed, were prominent influencing factors that suggest to what level these legislators will support programs of the CES. Obviously, place of residence and previous experience with 4-H are important factors for support. It seems obvious that educational and developmental programs to promote a healthier and safer lifestyle would have great appeal to legislators. One would think that human resources development programs would receive high support from legislators. So, it was with high interest that I looked for the results and conclusions of this particular study.

An important approach specified in the problem statement is that the CES is perceived as serving the rural and farm population, Louisiana, like many other states has a state legislature with people from more urban backgrounds and experiences. This orientation is critical for the CES in most states to address.

The objectives and procedures followed seemed most appropriate given the arguments presented and the problems being faced. The attempt to obtain a higher response that typically received by mail surveys was probably improved a great deal by using county agents to make personal contacts. A 76 percent response rate was impressive from such a targeted group. The researchers expressed concern on the variation in perceptions by response wave. Not knowing these differences and possible association with certain demographic variables, time of response, etc. it is most difficult to determine how valid the generalizations from the study are. It would be most interesting to hear the researchers elaborate on this particular phenomenon. Granted the length requirements on this paper did not allow the researchers to elaborate to the extent I would have wished.

The results for Louisiana, a typically rural state, were most positive. The real value in this study lies with the model for conducting the research effort and obtaining such a high response rate. It was interesting to note that prominent support came from Democrats. In Wyoming, for example, the prominent support would probably come from Republicans. One issue that the researchers probably had no opportunity to measure was the possible positive influence that the visit by the county agent had just by dropping by to deliver the survey to the legislator. Perhaps the authors could comment on this issue as well. Overall, the researchers have made a valuable contribution to the profession by presenting this report.

ERIC

NAERC '99

Research Fresh from Florida

Assessing Farmers' Internships and Needs for Specialty Corn and Soybean Information in the Lower Illinois River Basin

Burton Swanson
University of Illinois

Mohamed Samy
University of Illinois

Andrew Sofranko
University of Illinois

Joe Harper
University of Illinois

Rita Frerichs
University of Illinois

INTRODUCTION

Increasing demand in overseas and domestic markets for specialty corn, soybeans, and other crops has created considerable farmer interest in producing specialty crops for different end-use markets. In the past, most specialty crops have been grown by a limited number of farmers under contract with grain handlers who specify the production technologies and post-harvest procedures to be followed, with quality attributes and standards being contractually defined. Given depressed commodity prices and considerable attention in the popular farm press about specialty crops, many

more farmers want to participate in this rapidly expanding market. At the same time, it appears that most farmers lack sufficient information about markets, production and post-harvest technologies, and other information needed to successfully produce and market specialty crops. Therefore, the problem addressed by this research was to determine the extent of farmer participation and interest in specialty production and then to determine the level of farmer knowledge and information about specialty corn and soybeans.

Historically, independent farm producers acquired technical information and management skills from public sources, such as the cooperative extension service. In recent years private sources of information, such as seed, fertilizer, chemical, machinery companies, and end-users, have grown in importance. (Huffman, 1998). As the value of information increases, there are greater incentives for the private sector to provide technology directly to farmers and then capture some of that value (Boehlje, 1997). With the increasing sophistication and complexity of the food and agricultural sector, those farmers with more information and technology have a comparative advantage. With declining public sector funding for information and technology dissemination, farmers are left with no choice but to seek information from the private sector, frequently through contractual relations with input suppliers and/or processors.

Implementing innovative educational programs, including technology transfer, has been a tradition within the agriculture education profession. The first step in planning an educational program for innovations such as specialty crops is to assess the educational/informational needs of farmers. Knowles (1980) and Boone (1985) define an "educational need" as the gap between the present level of competence and a higher level required for effective performance as defined by the individual, his organization, or his society. The educational needs of a person or a group making up a target public are the cumulative effects of a host of psychological, social, cultural, and physiological factors including socio-demographic characteristics, interests, culture, and vocabulary (concepts, skills, and values) (Boone, 1985).

Information needs have, increasingly, became an important component of farmers' educational needs. It is necessary for farmers to define new information as relevant and part of their needs in order to start going through the innovation-adoption process (Rogers, 1995). Several studies of specialty crop farmers strongly indicated that these farmers view the fulfillment of their information needs as an essential stage in the process of making competent farming decisions (Trede & Whitaker, 1998). For example, Mississippi greenhouse tomato growers indicated that they had to rely upon a variety of sources to satisfy their information needs to successfully carry out an Integrated Pest Management (IPM) program (Chou, et al. 1995). Iowa "beginning farmers" considered transfer of specialty crop information and technology to be important elements in current and future educational programs (Whitaker & Trede, 1998). In addition, Gamon & Scofield (1996), in their study of young Iowa farmers, pointed out that the younger farmers tend to rate the importance of seed, fertilizer, and chemical dealers more highly than older farmers do. These studies indicate a shift away from traditional sources of information, as well as a recognition that new types of information are needed for successful farming.

PURPOSE AND OBJECTIVES

The purpose of this research was to carry out an assessment of the information and educational needs of farmers in one area of Illinois – the lower Illinois River basin – as a first step toward developing educational materials and programs on specialty crops. The specific objectives of this research were as follows:

1) To identify specific socio-economic characteristics associated with those farmers who are interested in producing specialty crops so educational programs could be targeted to their needs.
2) To assess the level and adequacy of farmers' information about different specialty crops.
3) To determine specific content areas that farmers feel are necessary to successfully produce and market specialty crops.

METHODS AND PROCEDURES

The research findings summarized in this paper are part of a broader research and extension project to *improve farm incomes and rural communities through specialty farm products*. The first phase of this project focused on three pilot project areas representing the lower Illinois River basin. These counties are Adams, Brown, Christian and Woodford counties. The ultimate goal of the overall project is to accelerate farmer involvement in and control over the production and marketing of specialty farm products. The findings reported here stem from the portion of the baseline survey that explored information and knowledge farmers had about specialty crops.

The first task carried out was a mail survey of all farmers in each pilot project area. This survey was designed to serve two purposes. First, the research findings would be used to plan agricultural research and educational programs for each of the project areas and the broader target area of the lower Illinois River basin. Second, this baseline data would be used in the third year of the project to measure the impact of the resulting research and educational programs on specialty crop production, farm income, the organization of producer alliances, and value-added processing within each pilot project area.

The survey instrument was constructed following an intensive library search and review of recent publications on specialty crops and value-added production in the Midwest. The extensive coverage currently being given to specialty crops in the popular press provided the justification for the topics covered in the questionnaire. Those topics that relate to the research in this paper include: (I) socio-economic characteristics, (II) production of specialty farm products, (III) specialty corn and soybeans information needs, (IV) importance of different types of information, and (V) concerns about specialty crops. In each county the content and format of the questions in the survey instrument were reviewed by a local stakeholder group that was formed to oversee the survey design and also to make recommendations concerning use of the data. While the main core of questions remains intact across the four counties, there are slight variations in number and wording of selected questions to accommodate local needs. The questions, which are the basis for the findings reported here, were identical in all three surveys covering four counties. Pretests were conducted with farmers in Vermilion and Champaign counties to determine the relevance, readability, and usefulness of the questions. In

ERIC

addition, face and content validity of the instrument were established using the farmers in the pretests. To measure the internal consistency of the instrument, Cronbach alphas were calculated for section III (r = .90), section IV (r = .83), and section V (r = .92) using a pilot test group of 100 farmers in Woodford County.

The population of this study included all active farmers in the lower Illinois River basin. Therefore, the sample of this study consisted of all active farmers in each of the four selected counties. Their names and addresses were compiled from Farm Service Agency lists of farmers in the county. Landlords who are not active farmers were excluded. In each case the survey went out with a cover letter from the county extension office which assumed responsibility for the mailings and answering farmer questions about the study. The dates of data collection, and the total number of farmers and respondents for each pilot project area are shown in Table 1.

Table 1
Pilot Project Areas, Data Collection Dates, And Number and Percentage of Respondents

Pilot Project Area	Dates of Data Collection	Total No of Farmers	Total No of Respondents	Percentage Responding
Woodford County	Oct. – Nov. 1998	1008	399	39.6%
Adams/Brown Counties	Mar. – April 1999	1670	405	24.5%
Christian County	Mar. – April 1999	632	212	33.5%
Totals		**3310**	**1016**	**30.7%**

As shown above, data collection in Woodford County occurred in November and December 1998, following harvest. Data collection in the other two pilot project areas was delayed until late March—April 1999. This unavoidable delay in data collection conflicted with spring planting preparations, thus the lower response rate in the latter two pilot project areas. Comparisons on key variables, such as the number of farmers currently producing specialty crops, farmers who are interested in specialty crops, and the information variables reported in this paper, showed no measurable cross-group differences.

RESULTS AND FINDINGS

The presentation of findings reported here reflect the research objectives. First, the socio-economic characteristics of farmers in the target areas are described and then these factors are regressed on *interest in specialty crops* as a dependent variable. Next, farmers were asked to assess their level of information about different specialty corn and soybean crops and to indicate whether they needed more information on each crop. These findings are repeated in the second section. Finally, results are presented from farmers' assessments of their current level of information about specific content areas necessary to produce and market specialty crops and their expressed need for additional information about these concerns.

Socio-economic characteristics of farmers interested in producing specialty crops

At the outset of this research project, the research team thought small-scale farmers would be the group most interested in specialty crops so that they might diversify and increase the profitability of their farming operations. Also, information on farmers and their operations was considered important in targeting educational programs to those farmers who would be most interested in producing specialty

crops. In the survey farmers were asked a number of questions which helped to characterize and differentiate the farmer population. These findings are presented in Table 2, with the socio-economic data being differentiated by farmers' interest level in producing specialty crops.

As shown in Table 2, 18.5% of the survey respondents indicated that they are already producing specialty crops, while another 26% said they are interested in getting involved. Slightly over 41% of the respondents indicated that they were not interested in specialty crops, and another 14% were unsure about their interest. Important differences are seen among these four levels-of-interest groups. First, farmers who are producing or who are interested in producing specialty crops are younger, with fewer years in farming, and have had a slightly higher level of education than those farmers whom are not interested. Second, access to resources, as measured by number of acres farmed and on-farm storage capacity, was positively related to farmers' level of interest in specialty crops. Third, the percentage of family income derived from farming was somewhat higher among producing and interested farmers in comparison with the non-interested farmers. The findings in Table 2 thus show that farmers' level of interest, which is represented in the four groups, is systematically related to several key socio-economic variables.

Table 2
Selected Socio-economic Characteristics of Project-Area Farmers, factors differentiated by level of interest in specialty crops

Farmer Level of Interest in Specialty Crops	Mean No. of Years in Farming	Age	Mean Years of Education	Average No. of Acres Farmed in 1998	Average On-farm Storage Capacity (Bu)	Farmers' Off-farm Job	Percent of Family Income from Farming	Total No. of Respondents
Currently Interested and Producing	25.6	49.2	13.6	877	44,036	No =53% PT = 3% FT = 4%	56.1%	188 18.5%
Interested	25.4	49.9	13.5	656	26,649	No = 47% PT = 22% FT = 32%	56.2%	262 25.8%
Unsure	25.5	52.0	13.0	422	17,556	No = 4% PT = 21% FT = 35%	53.7%	145 14.3%
Not Interested	31.1	60.1	12.6	316	10,222	No = 49% PT = 15% FT = 36%	48.9%	420 41.4%
Totals	27.8	54.2	13.1	525	22,202	No = 49% PT = 21% FT = 30%	53.8%	100%
	982	998	993	990	957	902	906	1,015

*Note. Off-farm job (No = no off-farm job, PT = part time, and FT = full time)

Relative Importance of Different Socio-economic Factors

A major concern of this study was to identify the socio-economic factors influencing farmers' level of interest in specialty crops. Therefore, multiple regression analysis was performed to examine the relationships between farmers' interest in specialty crops, as the dependent variable, and five independent variables measuring age, schooling, farm size, off-farm employment, and on-farm storage capacity. The dependent variable, level of interest, was measured by using farmers' responses on questions about their interest in specialty crops. This variable was coded on a four-point scale where 3 indicates "current involvement and expressed interest" in specialty crops; 2 indicates "interest"; 1 indicates "unsure"; and 0 indicates "not interested."

When entered into a stepwise multiple regression equation it was found that five variables explained 22.6% of the total variance of farmers' level of interest in specialty crops (Table 3). All five make a statistically significant contribution in explaining level of interest among farmers. The most important variable in explaining the variance was age ($\beta = -.309$), which means that as the farmers' age increases their level of interest in specialty crops decreases. The second and third most important factors were on-farm storage capacity ($\beta = .167$) and farm size ($\beta = .157$). In both cases, as on-farm storage capacity and farm size increase, farmers' interest in specialty crops also increases. The fourth variable was off-farm employment ($\beta = -.105$), which indicates that as off-farm employment increases, farmer interest in specialty crops decreases. The last variable in the model, years of education ($\beta = .071$), was positively correlated with farmers' interest in specialty crops.

The results of the overall F test indicate that the multiple regression model is significant at (.01) level. From this preceding analysis, it can be concluded that farmers' interest in specialty crops is significantly associated with younger age, larger on-farm storage capacity, larger farm-size, lower off-farm employment and a higher level of education.

Table 3
Stepwise multiple regression of selected socio-economic variables on farmers' interest in specialty crops

Variable	β(Beta)	T
Age	-.309**	-8.680
On-farm storage capacity	.167**	3.889
Farm size	.157**	3.574
Off-farm employment	-.105**	-2.886
Education	.071*	2.095

Note. $F = 44.5$**, $R^2 = 22.6$, * $P < .05$; ** $P < .01$

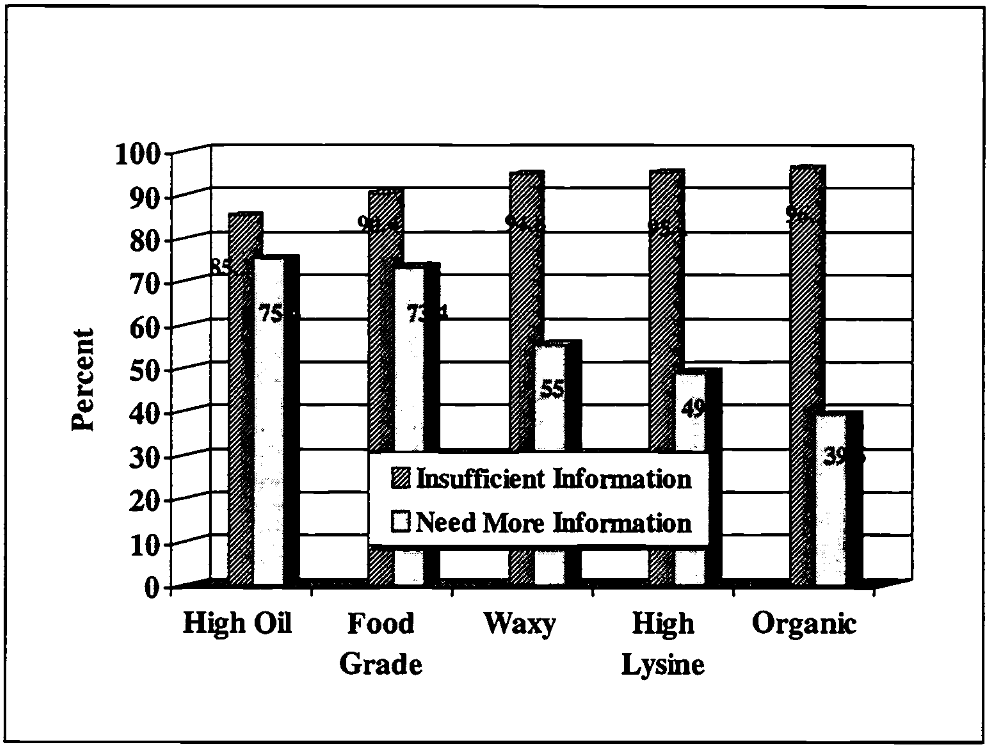
Specialty Crop Information Needs

To plan a specialty crop educational program, the research team assessed the farmers' current level of information about different specialty crops currently being grown in Illinois. First, farmers were asked to assess their own level of information about specialty crops and, second, to indicate whether they needed more information on each of these crops. The questions from which these assessments are made were limited to those farmers who are currently producing or who are interested in specialty crops. These findings summarizing farmers' current level of information and their assessment of whether they need more information are found in Figures 1 and 2.

ERIC

As shown in Figure 1, which lists five of the most common types of specialty corn, most farmers have very little information about any of them. Given the rapid spread of high oil corn, about 15% of the farmers said that they have adequate information about this crop. Farmers having adequate information about the other specialty crops ranged from as little as 4% for organic corn to about 10% for food-grade corn.

Figure 1:
Percentage of Farmers with Insufficient Information (N = 406) and Needing More Specialty Corn Information (N = 295)



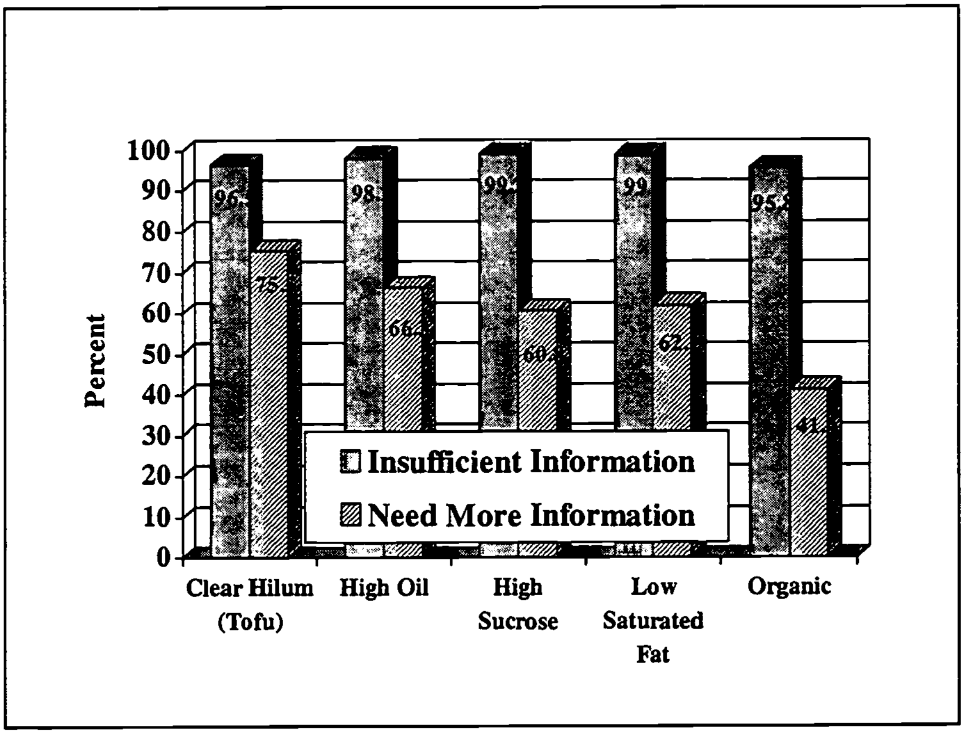
About three-fourths of the farmers who indicated that they have insufficient information responded to the second question about whether they wanted more information about these different crops. These findings are shown in the bar presented in Figure 1. About three-quarters of these respondents indicated they needed more information about high oil and food-grade corn. About 40% needed more information about organic corn.

The same approach was used in assessing the information needs of farmers about different types of specialty soybeans. These data are found in Figure 2, which shows that farmers are very poorly informed about most specialty soybean crops. In addition, those farmers wanting more information about different specialty soybeans ranged from about 75% for clear hilum or tofu soybeans to slightly more than 40% for organic soybeans.

The final set of questions used to assess the educational needs of farmers dealt with content areas that are important in producing and marketing specialty crops. First, farmers were asked to assess the adequacy of their information about these four different areas and, second, they were asked whether

they wanted more information on each of them. The results of this self-assessment are found in Figure 3. Most Illinois farmers have very little information about how to evaluate contracts, on which grain handlers buy specialty crops, and what production and post-harvest management practices need to be followed to successfully produce and market specialty crops. The vast majority, ranging from 83% to about 86% of these respondents, want educational programs that will provide this information.

Figure 2:
Percentage of Farmers with Insufficient Information (N = 398) and Needing More Specialty Soybean Information (N = 294)



CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS

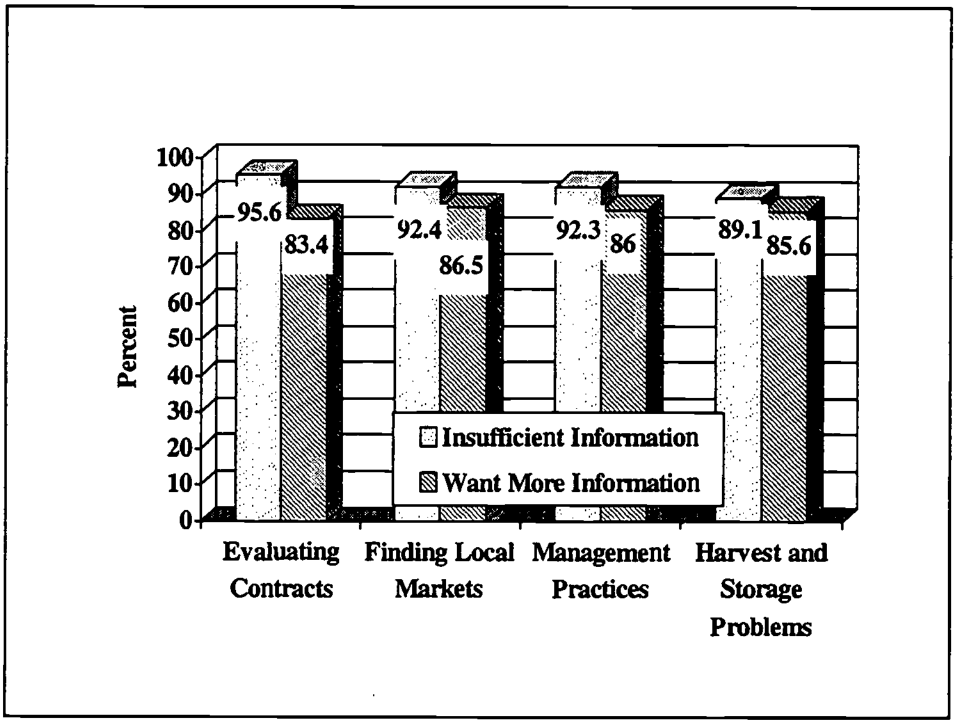
The research findings summarized in this paper were based on 1,016 respondents (a 30.7% response rate) who are actively farming in four counties of the lower Illinois River basin. About 44% of the respondents were either currently producing specialty crops (18.5%) or were interested (25.8%) in producing them. About 14% were unsure of their interest and 41.4% said they were not interested. Farmers who are currently producing and/or are interested in producing specialty crops were found to be younger, with more on-farm storage, larger farms, with lower levels of off-farm employment, and with slightly more years of education.

Those farmers who are currently producing, or who are interested in producing, specialty crops were asked a series of questions to assess their needs for educational programming. With the exception of high oil corn, more than 90% of these respondents indicated that they had insufficient information on different types of specialty corn and soybeans. About three-fourths of these interested farmers indicated that they wanted more information on specific specialty crops, ranging from about 40% who wanted

ERIC Full Text Provided by ERIC

more information on organic corn and soybeans, to about 75 percent who wanted more information on food-grade corn and soybeans (clear hilum or tofu). In terms of four content areas, about 90% or more farmers indicated that they had insufficient information and wanted more information on contract evaluation (83.4%), local specialty crop markets (86.5%), production management practices (86.0%), and harvest and post-harvest technologies (85.6%).

Figure 3:
Percentage of Farmers Who Have Specific Educational Concerns about Producing and Marketing Specialty Crops (N = 433)



These findings confirm the need for educational and information programs for specialty corn and soybean production, post-harvest handling and storage, marketing, and contract evaluation. It should be noted that during the review of literature for this research, the team also searched for educational programs and resources on specialty corn and soybeans within the Midwest, including land-grant universities, cooperative extension, and the private sector. After this review, it was determined that very few educational resources are currently available about these crops. This lack of educational material and information about specialty crops is consistent with the general lack of farmer information and knowledge observed in this study. Based on these conclusions, there appears to be an urgent need to develop educational and information tools on these specialty crops for those farmers who are interested in producing different types of specialty corn and soybean crops to diversity their farming operations as a means of increasing farm income.

Based on meetings with the local leadership team in each project area, these findings were anticipated. Therefore, concurrent with the collection and analysis of this baseline data, other members of the research-extension team began preparing specialty crop fact sheets that would outline production and post-harvest technologies. Included in each fact sheet is a partial budget analysis framework that

ERIC

would help farmers compare the profitability of each specialty crop with their conventional corn and/or soybean crop. In addition, all of the grain-handling firms in Illinois (about 1,100) were surveyed to determine if they currently handle different types of specialty corn and soybean crops. All of this information on specialty crop technologies and markets has been transformed into user friendly, web-based educational materials that can be found at the following web-site: http://web.aces.uiuc.edu/value/. This source of specialty crop information was announced to Illinois farmers in mid-June 1999.

Finally, these specialty corn and soybean fact sheets, and a directory of specialty corn and soybean grain handlers directory have been printed and distributed to interested farmers throughout the state by means of University of Illinois Extension and county Farm Bureau offices. The use of print media was considered essential since many farmers do not have Internet access. In addition, value-added conferences have been held in each pilot project county. These conferences have covered specialty crop technology and marketing issues along with related topics including contract evaluation, identity preservation (IP) procedures, organizing producer alliances, and value-added processing.

ERIC Full Text Provided by ERIC

REFERENCES

Boehlje, M. (1997). Industrialization of agriculture: Implication for cooperatives. American Cooperation: An Annual Review of the Year in Cooperatives, 1997, 6-14.

Boone, E. G. (1985). Developing Programs in Adult Education. Englewood Cliffs, NJ, Prentice-Hall, Inc.

Chou, T., Newman, M., Killebrew, F., & Synder, R. (1995). A description of greenhouse tomato growers and their use of an extension-recommended integrated pest management program. Proceedings of the National Agricultural Education Research Meeting, USA, 22, 217-227.

Gamon, J. & Scofield, G. (1996). Perceptions of sustainable agriculture and preferred information sources: A longitudinal study of various groups of young farmers. Proceedings of the National Agricultural Education Research Meeting, USA, 23, 102-112.

Huffman, W. E. (1998). Modernizing agriculture: A continuing process. Daedalus, 4, 159-186.

Knowles, M. (1980). The modern practice of adult education: From andragogy to pedagogy. Cambridge: The Adult Education Company.

Rogers, E. (1995). Diffusion of Innovation. New York: The Free Press.

Trede, L. & Whitaker, B. (1998). Perceptions of Iowa beginning farmers towards education and education providers. Proceedings of the National Agricultural Education Research Meeting, USA, 25, 50-61.

Whitaker, B. & Trede, L. (1998). Current and future importance of selected agricultural subject matter topics as perceived by beginning Iowa farmers. Proceedings of the National Agricultural Education Research Meeting, USA, 25, 63-73.

ASSESSING FARMERS' INTERESTS AND NEEDS FOR SPECIALTY CORN AND SOYBEAN INFORMATION IN THE LOWER ILLINOIS RIVER BASIN

A Critique

Carl Reynolds
University of Wyoming

This paper is a report on a most needed type of extension research agenda, to determine what information is needed by which farmers to grow more specialty crops and thereby have the potential to raise their economic base. It also is a sequential step in a larger project to *improve farm incomes and rural communities through specialty farm products*. The impressive feature noted in this paper is that the results provide extension education personnel with valuable information in planning educational programs and the nature of the audience to which the program should be targeted.

The background provided in the introduction about the need for and sources of information upon which farmers need/rely was valuable for me as I began to develop a mental picture of the research project. One of the objectives of the study, to identify specific socio-economic characteristics of farmers who have an interest in growing specialty crops developed high interest in the report.

In the procedures followed, the work was carefully done to insure validity and reliability. The pretest (field test) was conducted with a similar sample of farmers in a different county. The Cronbach alpha results indicated that the instrument had a strong validity and consistency. Even though the response rate was low (30.7%), the researchers reported that cross-groups were checked and no measurable differences occurred, an important step in the research process.

In the results section, the selected socio-economic characteristics factors selected, age, years of education, number of acres farmed, on-farm storage capacity, and off-farm employment appeared to be logical choices and created a natural curiosity in the results. As expected, age, and off-farm employment were negatively associated with farmers' interest in specialty crops. However, it was interesting to note that on-farm storage bin capacity was positively linked to interest. This finding makes it easier for the extension specialist to identify those who would likely participate in educational programs on the subject. It was also shocking to note that the average percent of family income generated from farming was slightly over 50%.

This paper is an excellent report of a research project where every detail was addressed and reported in a clear and succinct manner. One question of curiosity that arose however, was since all the specific socio-economic factors selected were significant predictors of interest level in specialty crops, what process was used to select these factors? Also, what additional factors would you include if given the opportunity to repeat the study?

NAERC '99
Research Fresh from Florida

Perceptions of Stakeholders Towards Linkages and Curriculum in Urban Agricultural Education Programs

Larry Trede
Iowa State University

Donn Russell
Iowa State University

INTRODUCTION/THEORETICAL FRAMEWORK

There has been an increasing interest in urban agriculture education programs in secondary schools over the past decade. However, urban agriculture education is not new in the United States. W.B. Saul High School in Philadelphia claims to be the oldest urban agriculture school in the United States. It started in 1952 (Martin, 1995). Other urban agriculture programs can be found in Phoenix, Arizona, Indianapolis, Indiana, Kansas City, Missouri, Chicago, Illinois, and Des Moines, Iowa. All of these schools focus on career exploration, experiential learning, leadership, and an agriculture curriculum.

The agricultural education curriculum is in a state of transition. Foster et al. (1995) stated that agriculture has changed significantly and that the curriculum needs to change to reflect current business and industry needs. Scanlon et al. (1996) and Blezek and Dillion (1991) stressed the need for leadership, business management, computers, and personal development in the curriculum. McNeil (1990) stressed the need for giving attention to learning styles of students when developing curriculum. This was further supported by Rollins and Scanlon (1991), Cano and Martinex (1991), and Cano (1993).

Finch and Crunkilton (1993) viewed the integration of subject matter into one or more classes as a relatively recent movement in curriculum planning; however, many unanswered

ERIC

questions remain as to its effectiveness. Tanner and Tanner (1995) reported that students who are taught using an integrated problem-solving curriculum have noticeably superior academic records in college compared to students taught using a single discipline or subject-centered curriculum. In this case, an integrated curriculum is one where more than one subject matter is incorporated into a single problem-solving program area.

Research studies focusing on curriculum issues related to urban agriculture programs are very limited. Frick et al. (1995) reported that both urban and rural students held a positive view of agriculture; however, rural students had more knowledge of agriculture. Jewell (1989) reported that agriculture education programs were important to their communities. Foster et al. (1995) stressed the importance of biotechnology, food science, and natural resources as topics to be included in the curriculum. Harbstriet et al. (1989) stressed the need to develop education/training programs for urban businesses. Talbert and Weismiller (1998) reported favorable perceptions of agriculture by students enrolled in a magnet school even though they had little prior experience in agriculture. Frick et al. (1995) reported higher test scores for rural students than urban students. White et al. (1991) reported that employment opportunities existed for students enrolling in an agriculture magnet school. In summary, many of the studies have focused largely on business employment needs, perceptions and knowledge of agriculture, and why students enroll in urban programs.

The application of curriculum theory affects how the curriculum in urban programs is delivered, the content included, and ultimately what urban students learn. Dewey (1944) stressed that learning is based upon experience and begins at the understanding level. He believed that curriculum needs to provide opportunities to make mistakes so that the curriculum does not restrict initiative, reduce judgements to be made, and not mirror the complex situations of life.

Tyler (1949) focused on curriculum design to satisfy specific purposes and objectives. These objectives then become the criteria upon which the curriculum is built.

Contemporary authors have used Dewey's and Tyler's work to define and refine curriculum. Beauchamp (1983) stressed a written document and systematic decision-making. Sharpes (1988) defined curriculum as the art of teaching itself. McNeil (1990) promoted the needs assessment model as a way to enhance community involvement. Also, McNeil (1990) described the conception of curriculum into humanistic experiences, emphasis on societal needs, technology, and academic organization.

More direction is needed for urban agriculture education programs. The perceptions of stakeholders towards curriculum issues and topics are important in determining the ways to improve content and delivery. Also, issues facing urban agriculture programs are different than rural programs. The classroom structures and teaching methods for urban programs need to be examined. Equally important is how urban programs prepare students for careers.

PURPOSE/OBJECTIVES

The purpose of this study was to identify the perceptions of urban agriculture education stakeholders towards curriculum issues in urban agriculture education programs. Curriculum

issues, included but were not limited to, linkages in urban programs, curriculum components and emphasis, and subject matter topics to be taught.

The specific objectives of the study were:

1. to describe the demographic characteristics of the stakeholders
2. to determine the perceptions of the stakeholders towards urban agriculture program linkages, curriculum issues, and curriculum content
3. to determine the current and future importance of subject matter topics to be included in an urban agriculture education curriculum

METHODS/PROCEDURES

This study was a quantitative research study. Gall, et al. (1996) define quantitative research and its methodology as describing and explaining features of a problem by collecting numerical data on observable behaviors and subjecting these data to statistical analyses.

The targeted population for this study were the stakeholders involved in agriculture education. The participants in the 1998 National Forum for Agriculture Education served as the self-selected sample. The National Forum on Agriculture Education in Urban Schools was started in 1995. The purpose of the forum was to generate enthusiasm and create an environment for developing more urban-centered programs and assist professional currently working in urban programs (Martin, 1995). Annual forums have been held focusing on curriculum issues and related topics.

A total of 753 stakeholders were identified as potential participants in the 1998 National Forum. Invitations were extended to state Department of Education representatives, National FFA representatives, USDA official, urban Agriculture Education instructors. These instructors were identified from the 1997 Agriculture Education Directory for those programs found in the U.S. Census Bureau's definition of a metropolitan area, that is, "one city with 50,000 or more inhabitants and a total metropolitan population of at least 100,000." Sixty-three stakeholders voluntarily participated in the forum and 38 individuals responded to the survey instrument prepared for the study.

A self-administered questionnaire consisting of five parts was distributed at the 1998 National Forum. Part 1 of the questionnaire collected relevant demographic information. Parts 2 and 3 were designed to identify the stakeholders' perceptions towards linkages and curriculum issues in urban programs. A five-point Likert scale was used. Part 4 asked the respondents to rate 24 subject matter topics as to their current and future importance in an urban curriculum and to identify an appropriate teaching methodology for each topic. Part 5 included three open-ended questions related to the other parts of the survey.

A cover letter and questionnaire were distributed to the participants when they registered for the conference. They completed the survey and returned it prior to the beginning of the conference. Thirty-eight surveys were completed which represented 60.3% of those registering and attending the first day of the forum.

The face validity of the survey instrument was validated by a principal of an urban program, an urban agriculture education consultant, a statistician, the researcher's graduate committee, and Iowa State University Agriculture Education faculty. No other surveys were found after an extensive literature search so content and concurrent validity could not be tested.

A reliability score using Cronbach's alpha was determined for Parts 2, 3, and 4 of the survey instrument. The results of the reliability test were as follows: perceptions related to linkages (.34), perceptions related to curriculum components (.74), current important of subject matter topics (.89), and future importance of subject matter topics (.93). The low Cronbach's alpha coefficient for the perceptions related to linkages may be explained, in part, by the structure of the questionnaire. This ten question section contained three sub-sections with questions related to linkages on issues, linkages related to curriculum development, and linkages on urban programs. Too few questions were asked to determine a reliability score for each subsection.

RESULTS/FINDINGS

Demographic Information

Part 1 of the questionnaire was designed to collect data on the relevant demographic characteristics of the stakeholders. Nearly two-thirds of the respondents were male and all respondents ranged in age from 28 to 67 years with a mean of 45.7 years. Most of the respondents held a Masters Degree (50%). There were more respondents with a Ph.D. Degree (28.9%) than a Bachelors Degree (18.9%).

The respondents included 10 government personnel, three high school administrators, three university personnel, 18 agriculture education instructors and four who were FFA personnel or "other." The stakeholders range in years of experience in their current position was from one year to 29 years. Over half had five years or less of experience in their current position. Slightly more than one-fourth had 10 years or more of experience in their current position.

The stakeholders were asked to indicate the number of years that they had been involved in agriculture. Six (15.8%) indicated no experience in agriculture while 55.3% indicated one to 25 years of agricultural experience. The average number of years experience in teaching agriculture was 10.2 with seven respondents (18.4%) reporting no teaching experience and five (13.1%) reporting more than 20 years of teaching experience. Fifteen (39.4%) reported between one to 10 years of teaching experience.

Perceptions Towards Linkages in Urban Agriculture Curriculum

This section of the study was designed to identify the stakeholders' perceptions towards linkages in an urban agriculture curriculum. Respondents rated ten questions using a 5-point Likert-type scale. The ten questions were synthesized from the literature review, experience of the researchers, and from suggestions by the panel of experts. Table 1 shows the means and standard deviations for the ten questions and responses are listed from high to low based upon the mean scores.

The stakeholders most strongly agreed with the statement that "community linkages will enhance the development of urban agriculture education programs" (mean=4.78). The second highest rated statement was "linkages....[that] emphasize communication, leadership, and decision-

making skills" (mean=4.62). These two statements rated higher than many of the other statements. Statements that rated lower but still had a mean greater than 4.0 were "teachers are the primary source of establishing linkages in urban programs" (mean=4.08), and "when linking with agribusiness urban agriculture education programs should emphasize technology-based agriculture" (mean-4.02). The two lowest rated statements related to linkages were "business and industry are the primary source of linkages" (mean=3.67) and "subject matter specialists are the primary source of establishing linkages" (mean=3.27). Respondents were somewhat "neutral" to these two statements.

Perceptions Toward Curriculum Components in an Urban Agriculture Education Curriculum

Perceptions of the stakeholders towards curriculum components were identified in this section of the survey instrument. Important curriculum issues were also identified. Then statements were included and respondents rated each statement on a 5-point Likert-type scale. Table 2 shows the means and standards deviations and the statements are listed from high to low based upon mean score.

Table 1. Perceptions of stakeholders regarding linkages in an urban agriculture curriculum*

Statement	Mean	Std. Dev.
Community linkages will enhance the development of urban agriculture education programs	4.78	0.41
When linking with agribusiness, urban agriculture programs should emphasize communication, leadership, and decision-making skills	4.62	0.54
Urban high school agriculture should focus on those skills that are easily transferable to a variety of employment opportunities	4.24	0.83
There are more jobs available in agribusiness in your area than there are qualified candidates	4.08	0.82
Teachers are the primary source of establishing linkages in urban agriculture education programs	4.08	0.79
When linking with agribusiness, urban agriculture education programs should emphasize technology-based agriculture	4.02	0.64
Agribusiness greatly values the education that urban agricultural education programs provide	3.77	0.83
Parents greatly value the education that urban agricultural education programs provide	3.56	0.89
Business and industry are the primary sources for establishing linkages in urban agriculture education programs	3.67	0.91
Subject matter specialists are the primary source of establishing linkages in urban agriculture education programs	3.27	0.80

*Note: Response scale: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree.

The highest rated statement was "urban agriculture should emphasize the global dimensions of agriculture" (mean = 4.54). Stakeholders also rated quite the statements related to "emphasize hands-on activities" and "emphasize professional development." Both statements had a mean of 4.45. The stakeholders also rated the need to place "emphasis on Supervised Agriculture Experience projects" (mean = 4.27) and "emphasize the educational needs of college bound students" (mean = 4.21). The lowest rated statements were "...emphasize the education needs of students who seek employment after high school" (mean = 4.08) and "...emphasize technical training" (mean = 3.97).

Table 2. Perceptions of stakeholders regarding curriculum components in an urban agriculture curriculum.*

Statement	Mean	Std. Dev.
Urban agriculture should emphasize the global dimension of agriculture.	4.54	0.60
The curriculum in urban agriculture education should emphasize hands-on activities.	4.45	0.73
The curriculum should emphasize professional development in agriculture	4.45	0.64
The curriculum in urban agriculture education should emphasize Supervised Agriculture Experience (SAE) projects.	4.27	0.83
Urban agriculture education curriculum should emphasize the education needs of college-bound students.	4.21	0.71
Urban agriculture education curriculum at the secondary level should emphasize science based curriculum (i.e. applied physics with applications in agriculture).	4.16	0.79
Agriculture education curriculum should emphasize student directed learning.	4.13	1.00
Urban agriculture education curriculum should emphasize social needs.	4.13	0.63
Urban agriculture education curriculum should emphasize the educational needs of students who seed employment after high school.	4.08	0.68
Urban agriculture education curriculum at the secondary level should emphasize technical training.	3.97	0.83

*Note: Response scale: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree.

Perceptions Toward Current and Future Importance of Subject Matter Topics

To determine the perceptions of the stakeholders toward the current and future importance of the subject matter topics in an urban agriculture curriculum, twenty-four different subject matter topics were identified. These were rated by the respondents on a five-point Likert-type scale as to their current importance and future importance in an urban agriculture curriculum. Future importance was defined in terms of their importance in five years. The Likert-type scale ranged

from extremely unimportant to very important. Table 3 shows the means and standard deviations for each of these topics and are listed in descending order of future importance. Mean scores varied from 4.57 to 3.37 indicating a large variation among the respondents.

Of the ten subject matter areas rating the highest in future importance, nine of the ten were also rated as the highest in current importance. The ten highest rated subject matter topics were: leadership, environmental science, biotechnology, agribusiness management, food science, landscape/turf management, agriculture communications, horticulture, natural and recreational resources, and FFA. Only agribusiness management was not in the top ten based upon current importance. The future importance means for the top ten topics ranged from 4.46 to 4.79. The highest rated subject matter topic was leadership (4.79) followed by environmental science (4.76) and biotechnology (4.74). They were also the highest rated topics in terms of current importance.

The lowest rated subject matter topics in terms of future importance were: farm management, agriculture mechanics, business English, business math, accounting, forestry, veterinary medicine, agronomy, finance, and aquaculture. Only agronomy was not included in the lowest rated topics in terms of current and future importance. The mean scores for the ten lowest rated topics ranged from 3.33 to 4.21.

ERIC Full Text Provided by ERIC

Table 3. Perceptions of stakeholders toward the current and future importance of subject matter areas in an urban agriculture curriculum.

	Current Importance			Future Importance		
	n	Mean	Std. Dev.	n	Mean	Std. Dev.
Leadership	29	4.55	0.69	29	4.79	0.41
Environmental Science	29	4.31	0.54	29	4.76	0.44
Biotechnology	27	4.33	0.68	27	4.74	0.53
Agribusiness Management	32	4.13	0.87	32	4.59	0.56
Food Science	29	4.17	0.76	29	4.59	0.63
Landscape/Turf Grass Management	29	4.14	0.74	29	4.52	0.51
Agriculture Communications	32	4.16	0.72	32	4.50	0.57
Horticulture	29	4.41	0.50	29	4.48	0.51
Natural/Recreational Resources	28	4.36	0.62	28	4.46	0.58
FFA	28	4.29	0.94	28	4.46	0.92
Information Management	27	3.81	1.08	27	4.41	0.89
Marketing	28	4.11	0.79	28	4.36	0.73
Agriculture Sales	32	3.97	0.90	32	4.31	0.69
Animal Science	29	4.28	0.80	29	4.31	0.81
Aquaculture	29	3.83	0.80	29	4.21	0.68
Finance	27	3.93	0.73	27	4.19	0.68
Agronomy	28	4.04	0.69	28	4.18	0.55
Veterinary Medicine	28	3.86	0.93	29	4.14	0.85
Forestry	29	3.76	0.79	29	4.10	0.62
Accounting	30	3.57	0.97	30	3.97	0.56
Business Math	28	3.50	1.20	28	3.96	1.14
Business English	27	3.52	1.22	27	3.96	1.09
Agricultural Mechanics	31	3.64	0.98	31	3.48	1.06
Farm Management	27	3.37	0.93	27	3.33	0.96

CONCLUSIONS/RECOMMENDATIONS/IMPLICATIONS

Based upon the findings of this study, several conclusions can be made:

1. Linkages established with communities in which an urban agriculture program resides are perceived to enhance the development of that program.
2. Agribusiness linkages with urban agriculture program should emphasize communications, leadership, and decision-making.
3. A variety of linkages should be established and urban agriculture programs should generally not rely solely on subject matter specialists and business and industry as the primary sources for establishing those linkages.
4. When developing an urban agriculture curriculum, emphasis should be given to global dimensions, hands-on activities, and professional development. These rated as important components in a viable urban agriculture curriculum.
5. According to the respondents of this study, when developing an urban curriculum, SAE projects, educational needs of college-bound students, and a science-based curriculum were of moderate importance. These were rated as "neutral" to "important" as

components in the curriculum. Additionally, technical training and post-high school employment were rated as somewhat "neutral" by the respondents indicating less importance be given to the vocational training aspects and more emphasis to college preparatory and professional development.

6. The stakeholders perceived the subject matter topics of leadership, environmental science, biotechnology , agriculture business management, and food sciences as being most important in the development of the curriculum. These topics tend to be science-based rather than production agricultural skill based.
7. At the same time, these same stakeholders perceived that the traditional production agriculture skill areas of agricultural mechanics and farm management being of lesser importance in the future.
8. The stakeholders perceived that information management as the subject matter topic area that will increased the most in importance over the next five years.

Based upon the findings of this study, several recommendations can be made and implications identified:

1. Teacher education programs will need to prepare teachers to teach those subject matter topics as being most important in the future. Many of the topics are tied to a science-based curriculum and involve cutting-edge technologies related to environmental science and biotechnology.
2. The emerging science-based curriculum topics identified by the stakeholders will require adequate in-service training and instructional materials for urban agricultural education teachers.
3. Program linkages to a variety of community resources are important when developing an urban curriculum. Urban agriculture teachers should be provided the necessary knowledge and training to develop and maintain those linkages.
4. This study adds to the body of knowledge related to curriculum needs of urban programs. However, it needs to be replicated with other urban agriculture program stakeholder groups to ensure its reliability.
5. The results of this study are not generalizable to the urban agriculture stakeholder population; however, these results can serve as "baseline" information that would be useful for additional studies related to urban programs.

REFERENCES

Beauchamp, G. A. (1983). Curriculum theory (3rd ed.). Wilmette, Illinois: The Kagg Press.

Blezek, A. G. & R. D. Dillion. (1991). Perceptions of agribusiness leaders toward agricultural education in Nebraska. Journal of Agricultural Education 32(2): 34-39.

Cano, J. (1993). An assessment of the level of cognitive performance and critical thinking ability of selected agricultural education students. Journal of Agricultural Education 34(2): 25-29.

Cano, J. & D. Martinez (1991). The relationship between cognitive performance and critical thinking ability among selected agricultural education students. Journal of Agricultural Education 32(1): 24-29.

Dewey, J. (1944). Democracy and Education. New York, NY: The Free Press.

Foster, R., L. Bell, and N. Erskine (1995). The importance of selected instructional areas in the present and future secondary agricultural education curriculum as perceived by teachers, principals, and superintendents in Nebraska. Journal of Agricultural Education 36(4): 1-9.

Gall, M. D., W. R. Borg, & J. P. Gall (1996). Educational Research. An Introduction. 6th edition. White Plains, NY. Longman Publishers USA.

Harbstreit, S. R., B. R. Stewart, and J. R. Birkenholz (1989). Manager supervisor perceptions of the educational needs of urban agribusiness employees. Journal of Agricultural Education 30(2): 10-17.

Jewell, L. R. (1989). Opinions of school administrations concerning the purpose, community acceptance, and occupational placement as a basis for justification of vocational agriculture programs. Journal of Agricultural Education 30(2): 52-57.

Martin, R. A. (Editor) (1995). Forum on agricultural education in urban schools. ISU ASSIST program and Agricultural Education and Studies Department, Iowa State University, Ames, Iowa.

McNeil, D. (1990). Curriculum. A Comprehensive Introduction. 4th ed. Los Angeles, CA. Harper Collins.

Rollins, T. J., & D. C. Scanlon (1991). The cognitive, perceptual, and instructional preferences of agricultural education students. Journal of Agricultural Education 32(3): 48-53.

Scanlon, D. C., T. H. Bruening, & A. Cordero (1996). An industry perspective on changes needed in agricultural education curricula. Journal of Agricultural Education 37(2): 17-23.

Sharpes, D. K. (1988). Curriculum traditions and practices. New York, NY: St Martin's Press.

Talbert, B. A., & L. A. Weismiller (1998). Partners in active learning support (PALS): A case study of three Indian programs. Proceedings of the 25th Annual National Agricultural Education Research Meeting 25: 247-257.

Tyler, R. W. (1949). Basic principles of curriculum and instruction. Chicago, IL. The University of Chicago Press.

White, C. D., B. R. Steward, & R. E. Linhardt (1991). Career opportunities in agriculture as perceived by inner city high school students. Journal of Agricultural Education. Spring, 30-34.

ERIC

A CRITIQUE OF PERCEPTIONS OF STAKEHOLDERS TOWARDS LINKAGES AND CURRICULUM IN URBAN AGRICULTURAL EDUCATION PROGRAMS

A Critique

William L. Thuemmel
University of Massachusetts

Given a growing interest in urban agricultural education programs in U.S. high schools during the past decade, the researchers in this study sought to identify the perceptions of urban agricultural education stakeholders toward curriculum issues in urban agricultural education programs. Those stakeholders were identified as state Department of Education representatives, National FFA representatives, USDA officials, and urban Agricultural Education instructors.

The introduction/theoretical framework provided an excellent foundation for the study. This framework drew upon the well-established curriculum theories of John Dewey and Ralph Tyler as well as the more contemporary curriculum studies by researchers in agricultural education. However, several authors cited in the introduction were omitted from the reference list. The purpose/objectives were clearly stated--describe demographic characteristics, determine stakeholder perceptions, and determine current and future subject matter topics.

The statistical methods selected for this quantitative study were appropriate. Face validity of the survey instrument and reliability scores were reported. The target population for this study were 753 stakeholders who were identified as potential participants in the 1998 National Forum on Agriculture Education in Urban Schools. However, only 63 stakeholders (the experimentally accessible population) "voluntarily participated" in the forum and only 38 of those individual stakeholders responded to the survey instrument used for the study. Of the 38 respondents (the sample), only 21 (or 55%) were identified as urban agricultural education instructors or urban high school administrators. The other 17 respondents included government, university, or FFA personnel. Perhaps the latter group included specialists in urban agricultural education; however, this information was not reported in the demographic findings of the study. Although, all 38 respondents could be considered stakeholders in this study, it would have been helpful to stratify the sample into at least two categories and see if their collective perceptions differed. No measures were reported to control non-respondent sampling error, even though the response rate was only 60%.

A 5-point Likert-type scale was used to assess stakeholder perceptions toward urban agricultural education programs. The mean scores and standard deviations to statements listed on the survey instrument were listed chronologically, from high to low, in tabular form. The findings generally supported the conclusions, recommendations, and implications made by the authors. It was interesting to note that the respondents tended to favor community linkages; communication, leadership, decision-making , and hands-on skills; and the bio-science, technological, and global aspects of urban agriculture curricula; whereas, the linking of business and industry, subject matter specialists, and technical training were perceived as being the less favored aspects of urban programs. However, the perceptions of stakeholders toward the current and future importance of subject matter areas in an urban agriculture curriculum might well have reflected the individual specializations of the 18 agricultural education instructors who responded to the survey.

ERIC Full Text Provided by ERIC

The authors were careful to report in their final conclusion/implication that "the results of this study are not generalizable to the urban agriculture stakeholder population." The authors are to be commended for acknowledging this limitation--and for conducting research on an important topic that provides some "baseline" information for future studies of urban educational programs.

NAERC '99
Fresh Florida

Developing an Urban Agriculture Education Program: A Proposed Model

Donn Russell
Iowa State University

Larry Trede
Iowa State University

INTRODUCTION/THEORETICAL FRAMEWORK

Urban agriculture education is not new in the United States. W. B. Saul High School, Philadelphia, Pennsylvania, claims to be the oldest urban agriculture school in the United States. Started in 1952, the school's curriculum includes dairy science, horticulture, and other related agriculture courses. The school has approximately 675 students and admits 200 new students per year from 1,200 applicants (Martin, 1995).

During the decades of the 1990s, agriculture education in urban schools continued to gain more attention in the agricultural community. Today, approximately 2% of the U.S. population live on farms (National Resource Council, 1998) yet agriculture and the agribusiness industry account for over 18% of all jobs in the U.S. (Tevis, 1996) creating a situation whereby some jobs may go unfilled.

Several urban agriculture education programs exist in the United States. The Science and Technology of Agriculture and its Resources Academy (STAR) was formed in 1992. Goals for the STAR Academy were formulated by a steering committee and include preparing students for careers, providing leadership opportunities, making students productive citizens, and agricultural literacy. A four-year curriculum was established.

ERIC

Charter high schools have been established in several cities including Phoenix, Arizona. It was established in 1997 and is known as the Arizona Agribusiness and Equine Center. Charter high schools are schools that function as independent schools with no school district boundaries.

The Agribusiness Education Council was formed in 1995 in Des Moines, Iowa. The Council partnered with the Des Moines Public Schools to start a Food, Fiber, and Environmental Sciences program with specific goals related to awareness of career opportunities, real-life experiences, and providing a pool of interested individuals for employment by agricultural companies and organizations.

The first National Forum on Agriculture Education in Urban Schools was held in Ames, Iowa, in 1995. The purpose of the forum was "to generate enthusiasm and create an environment for developing more urban-centered agriculture education programs and assist professionals currently working in urban programs" (Martin, 1995). The National Forum has continued and has been conducted annually. Urban agriculture education curriculum issues remain the primary focus of forum participants.

PURPOSE/OBJECTIVES

The purpose of this study was to review the related literature and the theoretical framework focusing on an urban agriculture education curriculum and to develop a proposed model for urban agriculture education for the next decade. Also, the study sought to define the key characteristics of an urban agriculture curriculum based upon a literature review of recent students and curriculum theory and models.

The specific objectives of the study were:

1. to identify and review curriculum theory and models in agriculture education
2. to identify and review recent literature on urban agriculture education programs and curriculum found in those programs.
3. to develop a curriculum model based upon the literature review, curriculum theory, and curriculum models.

METHODS/PROCEDURES

This study was a historical research methodology. This methodology relies upon a systematic collection and evaluation of data to describe, explain, and thereby understand actions and events that occurred in the past, according to Frankel and Wallen (1993). The following sources were used to gather data for this study: ERIC database, Dissertation Abstracts, the Journal of Agricultural Education, bibliographies of related literature, the World Wide Web, and other sources. Studies in these references were located through a library system search completed in 1997-1999 at Iowa State University.

RESULTS/FINDINGS

Curriculum Theory and Models

The application of curriculum theory affects how the curriculum is delivered, the content included, and ultimately what students learn. John Dewey (1944) theorized that learning is based upon experience and would begin at the learner's understanding level. He stressed that curriculum needs to provide opportunities to make mistakes, not because it is desirable, but if there is not an opportunity to make mistakes it will restrict initiative, reduce judgements to be made, and not mirror the complex situations of life.

Ralph Tyler (1949) focused curriculum design to satisfy specific purposes or objectives. His curriculum theory used "ends-means" approach. By first defining the end purpose or objective, the curriculum is then organized and learning activities selected to fulfill the purposes or objectives. Tyler believed that curriculum development started with a discussion of philosophy, that is, philosophy impacted upon the development of the curriculum objectives.

Several authors have used Dewey's and Tyler's work to arrive at more contemporary definitions of curriculum and curriculum development. Beauchamp (1975) defines curriculum as a written document to be used by teachers for developing strategies for specific groups of students. Within the curriculum framework, he proposes learning opportunities for students, intended outcomes, activities, and instructional materials, and a timetable. Sharpes (1988) defines curriculum as the "art" of teaching itself; that is, the curriculum is what the teacher knows, how the teacher delivers the subject matter, and the teacher's personality. McNeil (1990) believes that curriculum theorists are not merely engaging in solving the practical problems of curriculum, but also are pursuing societal and individual components. He divides the conception of curriculum into four areas, namely, humanistic (personally satisfying experiences), social reconstructionists (emphasize social needs over individual needs), technologists (promote process for achieving what policy makers want), and academic (curriculum is that vehicle by which subject matter is introduced and organized). McNeil, through this curriculum conceptualization, promotes needs assessment as a way to enhance community involvement, and the development of goals and objectives.

There is a barrage of curriculum models found in the literature. For the purpose of this study, two categories were used, technical and vocational training models, and other rational models. The technical and vocational training models are often referred to as the ends-means approach to curriculum development. Emphasis is placed on determining educational purposes and these purposes are used to develop curriculum objectives and outcomes. The rational models are broader in their approach to curriculum development and often include goals related to personal development in addition to career related goals.

Examples of the technical and vocational training models are Tyler's Model, Vocational Curriculum Model for Agriculture, Technical Systems Model, Vocational Training Model, Authentic Assessment Model, and the Technical Prep Model. Two examples of the rational model are the Futuristic Model and the Needs Assessment Model. Each of these models are discussed with particular emphasis given to their potential interface with an urban agriculture education curriculum.

Technical and Vocational Training Models.

Tyler's model is built on the premise that the purpose, goal, and objectives must be quantified and then the curriculum is designed to fulfill the goals and objectives. According to Tyler (1949), it is an input, process, and output model. The model lends itself to how many agriculture education programs are organized today. An advisory council assists in developing goals and objectives. The agriculture education instructor develops and evaluates the curriculum.

The Vocational Curriculum Development Model is built on the premise that a curriculum is applicable to students at different learning levels. Students gain an understanding that different knowledge and skills are required at different employment levels. Curtis (1978) states that four employment levels are possible: operational, skilled, technical, and professional. Each level requires different skills and instructional training. This model is designed to promote vertical and horizontal development of students and spans all levels of occupational development in preparing students for the world of work.

The Technical Systems model relies heavily on the problem-solving approach as an instructional strategy. It, too, is an input, process, and output model, according to McCrory (1992). He describes the inputs as the resources of people, facilities, capital, and time. The process is communication related to the development and delivery of the curriculum. The output are the solutions to human needs.

The Vocational Training Model takes a narrow approach to curriculum development since it addresses only training students for an occupation rather than educating the whole person, according to McNeil (1990). The training model has two major functions, namely, determining specific competencies to be taught and determining manpower needs of the occupation it serves. Several criticisms exist of this model. Students are trained for "what is" rather than "what should be." Students are prepared for the normal circumstances encountered in an occupation or job and have no knowledge or skills when other situations are encountered.

Another vocational and training model is the Authentic Assessment Model. Being able to assess students in real life situations and problems is the major impetus behind this model. This, in turn, prepares students for real-life challenges. Authentic Assessment is also called performance assessment or alternative assessment. According to Gall, et al., (1996) evaluating tasks that have intrinsic value is an approach that is often used within the framework of this model. The problem-solving approach for real-life problems is the basic premise of this model. Johnson (1993) reported that many consider vocational education to closely resemble this model.

Schnellert (1993) outlined the Tech Prep Model whereby it is designed to prepare students to enter employment after high school or completing a vocational technical degree. Career preparation through vocational training is a major focus of the model. Training frequently occurs beyond the high school level in this model and frequently includes apprenticeships, on-the-job training, cooperative education, and continuing education. The goal of this model is to allow students to enter the work force with a high degree of technical competence.

For the purposes of this study, two examples of other rational models are presented. The Futuristic Model is built on the premise that the future will be different from the past. Therefore,

students need to be educated so that they are prepared to cope with the challenges of the future, according to McNeil (1990). Within the framework of this model, professional educators and others come together and brainstorm the future of a particular curriculum area. Information is gathered taking into account the social effects, economics, and time. Prioritization of this information is then completed and an evaluation of the present curriculum is made. From this process, some curriculum items may be discarded and new ones added to best prepare students for the future. Educational objectives are then weighted based upon the probability of future occurrences, social consequences, and the positive effects it will have on students. A major disadvantage of this model is that the future is difficult to predict leading to possible error.

McNeil (1990) states that the Needs Assessment Model is most frequently used for justifying goals and objectives. Resources can then be targeted in a most effective manner. The framework within this model involves identifying and prioritizing curriculum and school goals by groups of stakeholders. Prioritization is done by rating and tabulating the results. An assessment of learner performance within each goal area is done by using standardized tests. These are compared to the desired goal and curriculum adjustments are made by adding new courses, modifying existing courses, purchasing instructional materials, etc.

Agricultural Education and Urban Agriculture Education Curriculum

The second objective of this study was to identify and review recent literature in agriculture education and urban agriculture education curriculum to provide information and background in the development of a proposed model for urban agriculture education.

The agriculture education curriculum is in a state of transition. Foster et al. (1993) states that agriculture has changed significantly in the past decade and needs to change to better reflect the current industry and business needs. Foster et al. (1993) reported that local educators had a resistant attitude toward change, and that principals, in turn, were most inclined towards curriculum changes.

Scanlon et al. (1996) and Blezek and Dillion (1991) focused on agribusinesses' perspective of curriculum to be taught in agriculture education. Their analysis revealed that leadership, business management, computers, and personal development are all important topics to be included in the curriculum.

McNeil (1990) stressed the need to consider the learning styles of students when developing curriculum. Rollins and Scanlon (1991) and Cano (1993) found that agriculture education students preferred hands-on instruction and learning in small groups. Some differences in cognitive learning were found between agriculture education and other students.

Teaching and personality styles can also impact upon the development and delivery of curriculum. Cano et al. (1991) reported that teachers frequently teach the way they have been taught but prefer a learner-centered approach even though several other teaching styles were prevalent.

The literature review revealed very few studies specifically on urban agriculture education curriculum. Those studies that were reviewed focused largely on business employment needs, perceptions and knowledge of agriculture, and why students enroll in urban agriculture programs.

ERIC Full Text Provided by ERIC

Harbstreit et al. (1989) concluded that a need exists to develop education and training programs for urban business employs, particularly for adult learners. Talbert and Weismiller (1997) studied the attitudes of students in a midwest urban magnet school. They found that students in agriculture had favorable perceptions regarding agriculture even though they had little prior experience with agriculture. Frick et al. (1995) studied the knowledge and perceptions of both rural and inner-city urban high school students. From their study, it was concluded that both groups were most knowledgeable about natural resources and had a positive perception of agriculture. White et al. (1991) studied students enrolled in an agriculture magnet school in Kansas City, Missouri. Students in this study believed that job opportunities existed in agriculture and also believed that people working in agriculture should have an agricultural background.

Russell (1999) surveyed stakeholders of urban agriculture education programs regarding their perceptions toward linkages and key components of an urban curriculum. Stakeholders expressed a strong preference for linkages with communities in which an urban program resides. At the same time, these linkages need to emphasize communications, leadership, and decision-making skills, particularly with the community agribusiness industries. These linkages provide the nucleus of individuals for an effective advisory committee.

When developing an urban agriculture curriculum, these same stakeholders, as noted by Russell (1999), perceived that the curriculum should emphasize global dimensions of agriculture, hands-on activities, and professional development. Of lesser importance were Supervised Agriculture Experience projects, a strong science-based curriculum, and addressing the specific education needs of college-bound students. Regarding specific subject matter topics to be included in a curriculum, the stakeholders rated leadership, environmental science, biotechnology, agriculture business management, and food sciences as being the most important topics.

Proposed Urban Agriculture Curriculum Model

The third objective of the study was to develop an urban agriculture education curriculum model based upon the literature review of urban programs and curriculum theory and models. The literature review on urban agriculture programs revealed no curriculum models targeted specifically for curriculum development in an urban setting. However, several studies revealed the need for urban programs to reflect current industry needs. Important curriculum topics to meet those needs included leadership, business management, computers, and personal development. At the same time, many studies indicated that students had a positive attitude toward agriculture and that job opportunities existed.

Stakeholders of urban programs viewed the key components as strong linkages with agribusiness industry, emphasizing communications, leadership, and decision-making skills through those linkages. The need for a strong advisory committee was evident. Included in the curriculum should be an emphasis on the global dimensions of agriculture, professional development, and hands-on activities.

The proposed model is designed to meet those needs as previously described and be a continuous flow model with process evaluation occurring at the input, process, and product stages. Five critical principles were identified to guide the development of the model:

(1) simplistic design for ease of use,
(2) adaptability to a variety of school structures,
(3) continuous updating of the curriculum,
(4) integration of evaluation into the design, and
(5) evaluation to identify problems and to make changes.

Figure 1 shows the proposed curriculum model for an urban agriculture education program. It is patterned after Tyler's model and includes the three steps of inputs, process, and product. The Futuristic and Needs Assessment Model also influenced the proposed model in that the proposed model attempts to predict the future and involves people from different disciplines. Also, the proposed model focuses on identifying critical educational needs similar to the Needs Assessment Model. The solid lines depict the flow of the model. The dashed lines indicate points at which evaluation occurs with major input from the advisory council and others.

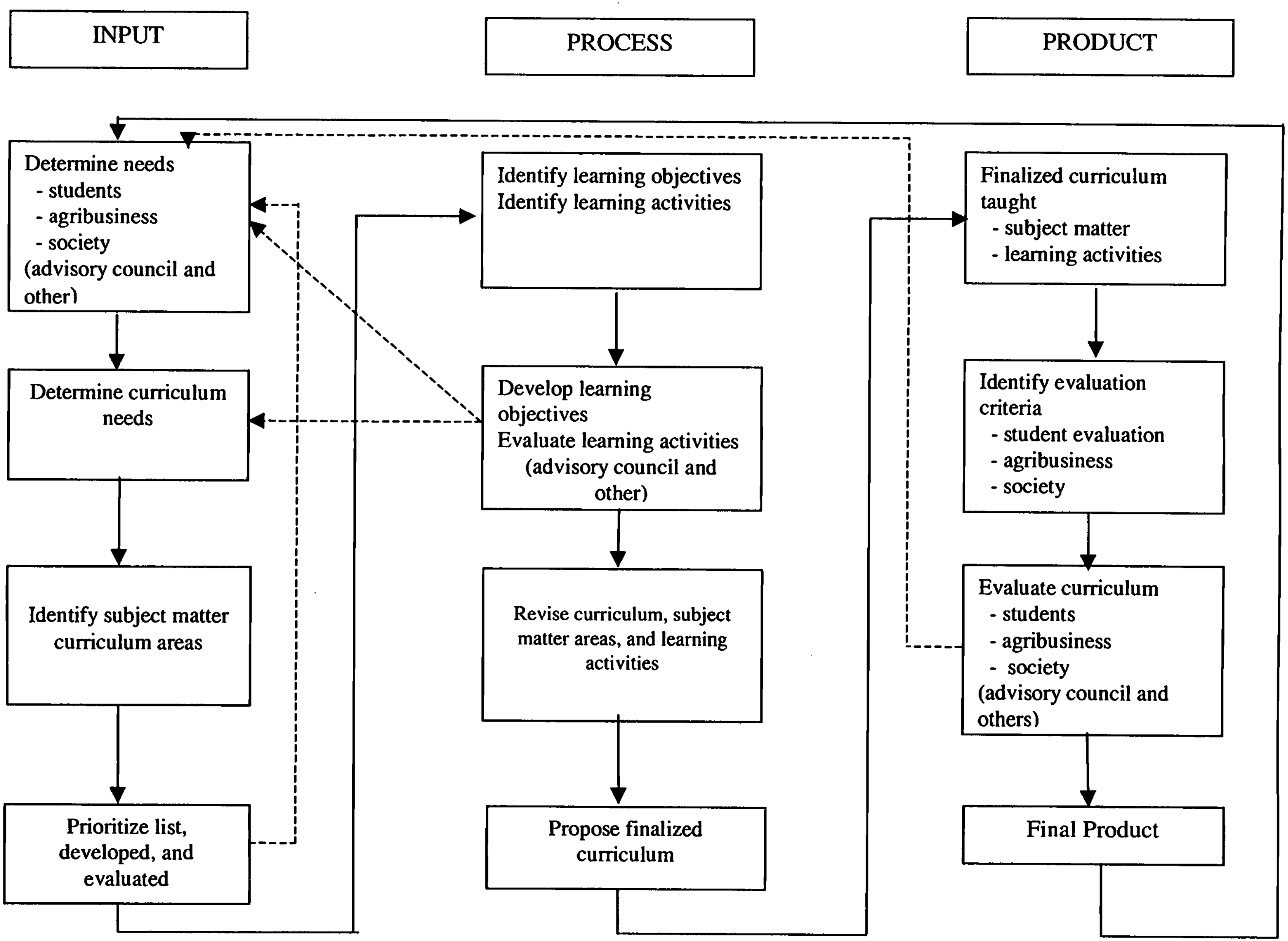
The first step under inputs is to identify student needs, agribusiness industry needs, and societal needs. These needs are identified and analyzed by an advisory council. The council structure should include a diverse representation of students, parents, instructors, administrators, agribusiness representatives, and other relevant stakeholders. Upon completion of the needs identification process, curriculum subject matter areas are identified, rated, and prioritized. Part of this process could include stakeholders' preference toward whether a specific subject matter area should be taught as a stand alone class or integrated into other classes. The final curriculum list should be evaluated against the needs previously identified.

The process step of the model develops learning objectives and activities for each subject matter topic. Learning objectives are evaluated against a list of key questions, factors, limitations, and constraints. Evaluation by the advisory council also occurs at this step with the outcome being a finalized curriculum.

The finalized curriculum is then moved to the third phase of the model with the curriculum being taught. The curriculum is evaluated by students, teachers, and the advisory council to see if it meets the needs and objectives identified. The product phase continues the process and insures that continuous evaluation occurs.

The axis of the proposed curriculum model is the advisory council. The council is involved in the input, process, and product stages of the proposed model. The strong need for an advisory council has been supported by the Grand Plan for Agriculture Education in Iowa (GPAEI) and nationally as published in a New Era in Agriculture (ANEA) in 1998.

Figure 1. Proposed curriculum development model for an urban agriculture education program



278

CONCLUSIONS/RECOMMENDATIONS/IMPLICATIONS

Urban agriculture education programs are growing in the United States. Several factors have contributed to this growth. The farm population is declining and is a smaller percentage of the total population today as compared to twenty years ago. Agricultural science-based jobs and service jobs in agribusiness industries are increasing providing more employment opportunities.

There is a need to relate the concepts of curriculum planning and modeling to urban programs. Limited research has been conducted on urban agriculture education programs. Very little is known about the curriculum components needed, the delivery methodologies to use, and the educational outcomes to meet the employment needs of agribusinesses.

Recent research data does indicate the strong need for a diversified advisory council to urban programs and the need for strong community-based linkages. These linkages should emphasize communication, leadership, and decision-making skills. Also, recent research indicates a need to emphasize the global dimensions of agriculture, hands-on activities, and the professional development of students. All of these are considered as key components of an urban program by the stakeholders of such programs.

The implications of this study are far reaching. Agricultural educators have studied rural agricultural education programs for many years but as the structure of agriculture changes more study will be needed for urban programs in order to make them successful. Curriculum subject matter topics and delivery may need to adjust for urban students. Program linkages including internships will need to change. Communication needs will change. Agricultural educators must meet those challenges in the next century.

ERIC

REFERENCES

Beauchamp, G. A. (1983). Curriculum theory (3rd. ed.). Wilmette, Illinois: The Kagg Press.

Blezek, A. G. & R. D. Dillion. (1991). Perceptions of agribusiness leaders toward agricultural education in Nebraska. Journal of Agricultural Education 32(2): 34-39.

Cano, J. (1993). An assessment of the level of cognitive performance and critical thinking ability of selected agricultural education students. Journal of Agricultural Education 34(2): 25-29.

Cano. J. & D. Martinez (1991). The relationship between cognitive performance and critical thinking ability among selected agricultural education students. Journal of Agricultural Education 32(1): 24-29.

Curtis, S. M. (1978). A multi-level curriculum model for vocational education in agriculture. "Identifying the strike zone." Journal of the American Association of Teacher Educators in Agriculture 19(1): 11-16.

Dewey, J. (1944). Democracy and Education. New York, NY: The Free Press.

Foster, R., L. Bell, and N. Erskine (1995). The importance of selected instructional areas in the present and future secondary agricultural education curriculum as perceived by teachers, principals, and superintendents in Nebraska. Journal of Agricultural Education 36(3): 1-7.

Frick, M. J., R. J. Birkenholz, H. Gardner, & K. Machtmes (1995). Rural and urban inner-city high school student knowledge and perception of agriculture. Journal of Agricultural Education 36(4): 1-9.

Gall, M. D., W. R. Borg, & J. P. Gall (1996). Educational Research. An Introduction. 6th edition. White Plains, NY. Longman Publishers USA.

Harbstreit. S. R., B. R. Stewart, and J. R. Birkenholz (1989). Manager supervisor perceptions of the educational needs of urban agribusiness employees. Journal of Agricultural Education 30(2): 10-17.

Johnson, S. D. (1993). Authentic assessment in technology teacher education. The Journal of Epsilon Pi Tau 18(2): 8-13.

Martin, R. A. (Editor) (1995). Forum on agricultural education in urban schools. ISU ASSIST program and Agricultural Education and Studies Department, Iowa State University, Ames, Iowa.

McCrory, D. L. (1992). Encyclopedia of educational research. New York: MacMillan Publishing Company.

McNeil, D. (1990). Curriculum. A Comprehensive Introduction. 4th ed. Los Angeles, CA. Harper Collins.

National Research Council (1998). Understanding agriculture: New directions for education (p. 9) Washington D.C.: National Academy Press.

Rollins, T. J., & D. C. Scanlon (1991). The cognitive, perceptual, and instructional preferences of agricultural education students. Journal of Agricultural Education 32(3): 48-53.

Russell, Donn H. (1999). Perceptions of urban agriculture education stakeholders toward curriculum. Unpublished PhD. Dissertation, Iowa State University, Ames, Iowa, 50011.

Scanlon, D. C., T. H. Bruening, & A. Cordero (1996). An industry perspective on changes needed in agricultural education curricula. Journal of Agricultural Education 37(2): 17-23.

Schnellert, G. L. (1993). Development of a curriculum model for vocational technology education. Unpublished doctoral dissertation, Iowa State University, Ames, Iowa

Sharpes, D. K. (1988). Curriculum traditions and practices. New York NY: St. Martin's Press.

Talbert, B. A., & L. A. Weismiller (1998). Partners in active learning support (PALS): A case study of three Indiana programs. Proceedings of the 25th Annual National Agricultural Education Research Meeting 25:247-257.

Tevis, C. (1996) Attracting urban kids to ag careers. Successful Farming. November, 64.

Tyler, R. W. (1949). Basic principles of curriculum and instruction. Chicago, IL. The University of Chicago Press.

White, C. D., B. R. Steward, & R. E. Linhardt (1991). Career opportunities in agriculture as perceived by inner city high school students. Journal of Agricultural Education, Spring, 30-34.

DEVELOPING AN URBAN AGRICULTURE EDUCATION PROGRAM: A PROPOSED MODEL

A Critique

William L. Thuemmel
University of Massachusetts

This was the second of two papers presented by the authors on urban agricultural education programs in this session. The first was a quantitative study; this is a qualitative study, employing an historical research methodology. This study culminates with the presentation of a proposed curriculum development model for an urban agricultural education program. The authors have used the balance of their paper to prepare a theoretical basis for the introduction of their proposed model.

The introduction/theoretical framework is summarized in an overly succinct fashion--an overview with only one reference cited. Mention was made of "The Science and Technology of Agriculture and Resources Academy (STAR)" being formed in 1992, and the "Arizona Agribusiness and Equine Center" (founded in Phoenix in 1997), with no references listed for the reader to pursue. Some description of the STAR program would have been helpful. The purpose/objectives of the study, however, were clearly stated--to identify and review curriculum theory and models and recent literature on urban agricultural education programs, and to develop a curriculum model based on this review. The methods/procedures used in the study appeared to be appropriate and data collection and evaluation were both systematic and reasonably comprehensive.

The results/findings were presented in four sections. First, a theoretical foundation was established for curriculum design on the research of John Dewey and Ralph Tyler. Further theoretical development was presented in citing the contributions of Beauchamp, Sharpes, and McNeil. The authors correctly summarized this section with the statement "There is a barrage of curriculum models found in the literature." The authors categorized the curriculum models considered for their study as "technical and vocational training models, and other rational models." Several examples of models were then introduced, briefly analyzed, and assessed in the second section. In the third section, recent literature in agricultural education and urban agricultural education curriculum were briefly reviewed. The findings from these studies were gleaned for possible inclusion in the proposed curriculum model. The fourth and final section in the findings was devoted to presenting the proposed urban agriculture curriculum model. The authors stated that "The need for a strong advisory committee was evident" since several studied reported the need for urban programs to reflect current industry needs. Perhaps--but are there not stakeholders of urban programs who are interested in education <u>about</u> agriculture as well as <u>in</u> agriculture? If so, those stakeholders will need to be included on the advisory committee as well--even though this was not evident from the studies reviewed by the authors. As was the case with the introduction/theoretical framework, the authors cited the Grand Plan for Agriculture Education in Iowa (GPAEI) and in the New Era in Agriculture (ANEA) as supporting a strong need for an advisory council without further identifying those references.

Using their narrative rationale, the authors have provided a good theoretical basis for introducing their proposed curriculum development model for an urban agricultural education program. The model itself builds on curriculum theory in general, uses advisory councils as its axis, and is worthy of considerable review and discussion. The authors are to be commended for furthering the agricultural education profession's efforts toward developing improved urban educational programs.

ERIC

NAERC '99

Fresh Florida

Using the AGED Network as an Instructional Tool to Integrate Technology in the Classroom

Gregory Thompson
Oregon State University

Susie Nelson
Oregon State University

INTRODUCTION/THEORETICAL FRAMEWORK

The challenge of integrating revolutionary and creative uses of technology into our public schools is upon many educators in America. Connecting to and effectively using the Internet is a specific challenge put forth to every public school in the United States (Clinton, 1996; Riley, 1996). Oregon has accepted this challenge and ventured into the implementation stage with the 1997 Oregon Technology Plan (OTP). The OTP specifies a need for ongoing, timely professional development to teach educators how to use technology (Oregon Department of Education, 1997).

To encourage further progression of the OTP, Oregon State Superintendent of Public Instruction, Norma Paulus emphasized a need for demonstration projects that used technology as a basis to improve instruction. Under this direction, the Oregon Department of Education's Office of Professional Technical Education and the area Educational Service Districts (ESDs) proposed a project to develop technological literacy among teachers and students. This project would provide agriculture and science teachers and their students access to an Internet source with an agricultural context through use of the AgEd Network (D. Sligar, personal communication, April 7, 1998).

The AgEd Network is an electronic textbook for high school agriculture teachers and students published by Stewart-Peterson, Inc. The AgEd Network features 700 classroom-ready

lessons, daily news reports, weekly quizzes, an agriculture issues library, and a FFA reference library. Statewide site licenses providing access to the AgEd Network were purchased with part of a two million-dollar grant for every agriculture teacher in the state of Oregon. Science teachers in schools with agriculture programs were also provided access to the AgEd Network. The goal of the proposed demonstration project was to provide a content rich medium that would improve instruction while encouraging the use of technology and the Internet. A requirement of the project committed Stewart-Peterson, Inc. and Oregon State University to provide agriculture teachers with inservice opportunities, teaching them how to use the AgEd Network as well as how to incorporate the Network's resources into their classrooms.

The OTP demonstration project provided the framework and need for follow-up research. Teachers were provided with training on how to access and utilize the AgEd Network via the Internet, and how this technology could be incorporated into their classrooms. Teachers had the opportunity to access a content rich resource while at the same time sharpen their Internet skills.

The Internet is becoming a more powerful and effective teaching and learning tool in the Information Age with an increasing number of schools establishing connections to the Internet (Gallo & Horton, 1994). Researchers have described the Internet as necessary for survival (Toffler, 1990), the key to our educational future (Dyrli & Kinnaman, 1995a), a reliable tool for current information (Fleck, 1994) and tremendously powerful for teachers and students (Dyrli & Kinnaman, 1995b). Advantages of Internet technology are the capabilities to learn independent of time and place, access a world of resources, research online, and communicate and collaborate internationally (Dyrli & Kinnaman, 1995a). These capabilities are utilized while networking on the Internet and other networks and are extremely beneficial for professional development activities (Anderson & Harris, 1997; Mathis & Nelson, 1995; Honey & Henriquez, 1993).

Student use of current and available information for research and from enhanced instruction is another benefit derived from access to the Internet. The incorporation of technology into instruction can aid student achievement (National Research Council, 1988). Utilizing the information superhighway in the classroom also enables students to participate in activities that develop their problem-solving and critical thinking skills (Talbert, 1995).

Teachers are not taking full advantage of technology because they don't know how and don't feel comfortable using it. "An online connection alone does not produce educational magic" (Dyrli & Kinnaman, 1995b, p.79). Educators have not had adequate training to use technology effectively, and they feel ill prepared using this resource in the instructional setting (Faison, 1996). While many students in today's teacher preparation programs are taught how to use the Internet, teachers who have been teaching for three to five years or more did not receive that instruction and do not fully utilize the power of technology. Neither do they know how or feel capable integrating aspects of the computer into their classrooms and lessons (Mehlinger, 1996; Fletcher & Deeds, 1994; Glenn & Carrier 1986; Diem, 1984). The logical answer to this problem is more and better training. As the Secretary of Education, Richard Riley, stated, " . . . technology is too important to the future of American education to let teachers go without the training they need" (1995, p.6).

Although training teachers to use technology is an important component for successful integration of technology into classrooms, teachers must also have a positive attitude toward technology. In a 1992 study of business educators enrolled in a teaching methods course, Hignite

and Echternacht recommended that both positive attitudes toward technology and adequate technology literacy skills are critical to the successful incorporation of new technology into the classroom.

While training is important, the type of training is critical. Technology must be viewed as a means to a greater end (improved learning), instead of an end in itself. To be successful with technology, teachers need to find effective uses for their technology (Sherman, 1998). "At the very minimum, teachers need to learn and understand how an Internet connection can become a part of their classrooms; they will need support in identifying and locating sources of information that contain resources of interest to them and are relevant to their academic disciplines; and they will need to learn how to acquire this information and incorporate it into their teaching." (Gallo & Horton, 1994, p.18).

The potential of using technology to improve student learning remains only a potential unless teachers have the necessary knowledge and skill to use technology appropriately and efficiently (DeBruyn, 1999). Teachers will be better prepared to integrate the Internet by learning about technology with technology (Willis, 1997) and about curriculum not just hardware and software (Persky, 1990). Siegel stated, "teacher in-service has to model how to use the technology in the teaching and learning process. The idea is not only to teach them how to use the hardware and the software, but how to integrate it seamlessly into the curriculum" (1994, p.34). If teachers are going to utilize the Internet and all of its capabilities and integrate their findings into their lesson plans efficiently and effectively, they need to be taught how (Rice, 1995; Swortzel & McCaslin, 1995; Gallo & Horton, 1994).

PURPOSE AND OBJECTIVES

The purpose of this research was to determine if the Oregon Technology Plan demonstration project accomplished the goals of assisting Oregon Agricultural Science and Technology (AST) teachers to utilize the Internet more efficiently and incorporate more Internet resources into their classrooms.

The specific objectives were to:

1. Describe the Oregon agriculture teachers' perceptions of Internet usage before and after utilizing the AgEd Network for one year.
2. Describe the Oregon agriculture teachers' perceptions of the usefulness of the AgEd Network as an instructional tool.
3. Describe the demographic characteristics of the Oregon agriculture teachers that were using the Internet.

METHODS/PROCEDURES

The target population for this descriptive study consisted of all Oregon AST teachers employed Spring 1998 (N= 105). The Oregon Department of Education supplied the name and school address for each teacher.

Upon completion of a one-year trial period using the AgEd Network, a cover letter and survey instrument was mailed to the subjects. Two weeks after the initial mailing, a second survey was sent to all non-respondents. Finally, a telephone call was placed and/or an e-mail message sent two weeks after the second survey as a final reminder. Useable responses were received from 98 teachers for an overall response of 93%. Comparing early and late respondents on the mean attitude scales using a t-test controlled non-response error. The t-values showed the attitude means were not statistically significant.

The three-part survey included the teachers' perceptions of the AgEd Network, their perceptions of Internet use before and after using the AgEd Network, and selected demographic questions. Part one, perceptions of the AgEd Network, consisted of 11 questions describing the teacher's general perceptions of the AgEd Network and three open-ended questions. Twenty-four questions were also included about the perceived usefulness of the AgEd Network. The 24 "usefulness" questions were on a Likert-type scale (5= strongly agree, 4= agree, 3= neutral, 2= disagree, and 1= strongly disagree).

The second part of the survey described teacher's perceptions of Internet use. Responses were measured with a 16 item five point Likert-type scale. Participants responded to statements in two separate columns, "before using AgEd Network" and "after using AgEd Network".

The instrument was reviewed by a panel of experts ($\underline{n}$=7) and pilot tested by a group of seven students in the Agriculture Education Master's of Arts in Teaching Program immediately following their student teaching experience. Cronbach's alpha (α= .9605) was used to estimate the internal consistency of the instrument.

RESULTS/FINDINGS

Objective one sought to determine teachers' perceptions concerning the use of the Internet by students and themselves. In each of the statements regarding Internet usage, the respondents' perceptions increased after using the AgEd Network. The alpha level was set *a priori* at .05. Thirteen of the sixteen statements concerning Internet usage were statistically significant at the .05 alpha level (Table 1).

Table 1.
Teachers' Perceptions Concerning Their Technology Usage Before and After Using the AgEd Network

Statement	Pairs N	Before AgEd Network Mean	Before AgEd Network SD	After AgEd Network Mean	After AgEd Network SD	t *
Comfortable using the Internet	67	3.97	1.07	4.30	0.73	.001*
Competent when using the Internet	67	3.75	1.20	4.07	0.86	.001*
Effectively use the Internet to download info.	66	3.64	1.25	4.02	0.97	.000*
E-mail as a communication tool	66	3.88	1.26	4.14	1.09	.034*
Sufficient Internet access in classroom/office	66	2.98	1.53	3.41	1.49	.001*
Students should learn to use Internet	67	4.42	0.74	4.63	0.62	.030*
Experience using the Internet	66	3.92	1.31	4.39	0.78	.000*
Received adequate Internet training	66	3.35	1.38	3.82	1.12	.000*
Admin.is supportive of Internet classroom access	66	4.02	1.07	4.09	1.11	.279
Lessons requiring students to access the Internet	65	3.11	1.34	3.64	1.25	.000*
Expect to make changes to computer equipment to better access Internet	66	3.61	1.14	3.91	1.08	0.10
School provides adequate inservice on Internet	66	3.14	1.16	3.26	1.19	.117
Students use the internet to do research	65	3.62	1.27	4.29	0.90	.000*
Quality of my students' research has increased with use of the Internet	64	3.63	1.13	4.34	0.74	.000*
Students' ability to do research has increased with use of the Internet	65	3.72	1.11	4.42	0.64	.000*
Students' desire to do research has increased	65	3.71	1.01	4.17	0.74	.000*

Note: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree
* Significance at .05

Additionally, mean responses indicating agreement to the Internet use statements were noteworthy. On a five point Likert-type scale, respondents felt comfortable (M = 4.30) and competent (M = 4.07) using the Internet after exposure to the AgEd Network. The participants also felt they more effectively used e-mail (M = 4.14) and more effectively used the Internet to download teaching information (M = 4.02) after using the AgEd Network. Utilizing the AgEd Network also assisted teachers in gaining more experience with the Internet (M = 4.39).

After using the AgEd Network, teachers felt more strongly that students should learn to use the Internet (M = 4.63). Teachers perceived that the AgEd Network increased the students usage of the Internet to do research (M = 4.29), the quality of students' research (M = 4.34), the students' ability to do research (M = 4.42), and their desire to do research (M = 4.17).

Research question two sought to determine teachers' perceptions regarding the value of the AgEd Network as a tool for improving the curriculum. Teachers agreed (mean greater than 4.0) that the AgEd Network provides valuable agricultural information for students (M= 4.22) and the content is relevant to curriculum needs (M=4.18) (Table 2).

Table 2. Teachers' Perceptions Regarding Value of AgEd Network in their Curriculum (n=73).

Use of AgEd Network	M	SD
AgEd Network provides valuable agricultural information for students	4.22	.70
Content of AgEd Network is relevant to curriculum needs	4.18	.82
Students find AgEd Network to be informative	3.95	.76
AgEd Network is organized in a logical manner	3.86	.80
AgEd Network helps students prepare for leadership activities and career development events	3.81	.87
Integrating AgEd Network into subject areas is easy	3.78	.93
AgEd Network contains appropriate learning activities for students to apply what they have learned about agriculture	3.75	.84
Students find AgEd Network to be fun and easy	3.41	.70

Note: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree

Figure 1 illustrates the amount of time teachers perceived they accessed the AgEd Network. Over one-forth of the participants indicated they did not have Internet access during the 1997-98 school year. Of the teachers that did have Internet access, 11% indicated they used the AgEd Network daily, 26% indicated they used the Network twice/week, 27.4% used the Network once/week, 19.2% used the AgEd Network monthly, 13.7% seldom used the Network and 2.7% had access but never used the AgEd Network.

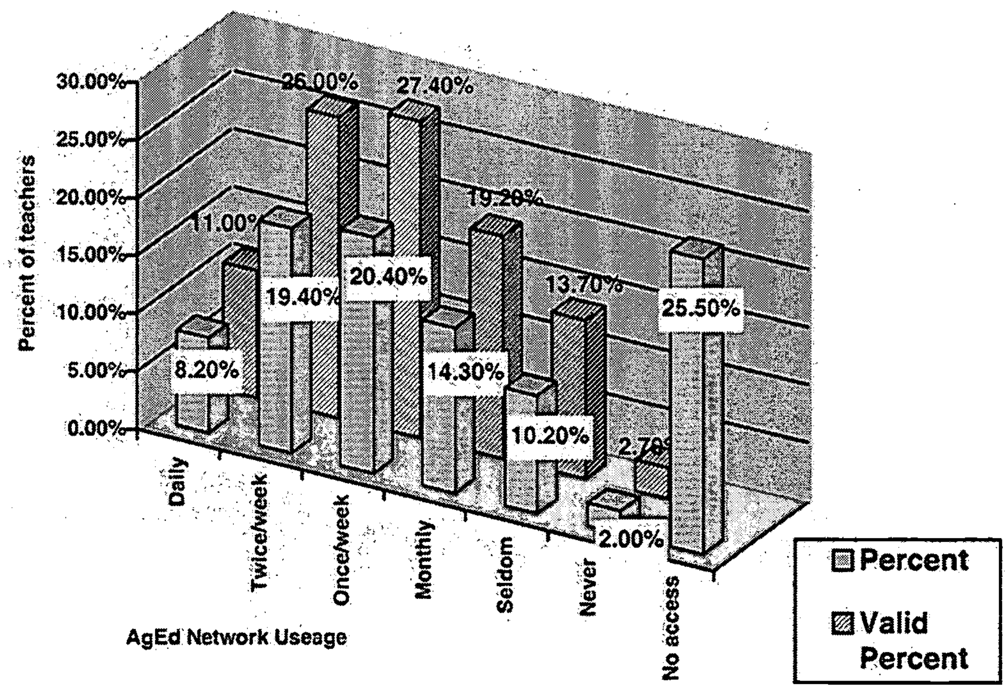


Figure 1. Amount of Time Teachers' Perceived They Used the AgEd Network (n=73)

BEST COPY AVAILABLE

Teachers were asked to respond to three open-ended questions concerning barriers and benefits to using the AgEd Network as well as needed improvements. There were 68 total responses related to barriers using the AgEd Network. Internet access (n = 30), time to use the Internet (n = 10), and lack of computers or adequate computers (n = 10) were the three responses listed most often by the participants. When asked to describe the benefits of the AgEd Network, there were 56 total responses. Current information (n = 20), easy access to information (n =10), research potential (n = 6), accessible lesson plans (n = 4) and agricultural issues (n = 4) were the most frequently responded answers. Teachers were also asked what improvements could be made to the AgEd Network. There were 28 total responses ranging from specific improvements such as adding wildlife topics to more general improvements such as including more news relevant to the Northwest United States.

Demographically, the average respondent was 42 years of age (SD =9.43) and had 14.73 years of teaching experience (SD =9.38). While 92% of the respondents were male, 8% were female. The respondents averaged slightly over two years (26 months) of Internet experience ranging from 0-96 months and had used the Internet in their agriculture program 20.52 months, ranging from 0-100 months. There was an average of 26.56 computers with Internet access in Oregon schools that have agriculture programs with a range of 1-201 computers.

CONCLUSIONS/RECOMMENDATIONS/IMPLICATIONS

Teachers in this study were able to utilize the Internet as a resource to supplement and enhance their curriculum through the use of the AgEd Network. The participants integrated technology into their curriculum as well as learned about the technology itself as has been shown important in other research (Siegel, 1994; Persky, 1990). The AgEd Network was an effective tool that taught technology with technology supporting related work by Willis (1997). As a result of using the AgEd Network, teachers were better able to use the Internet.

The teachers in this study felt that the Internet had a positive impact on students' ability and desire to do research as well as on the quality of the research (Dyrli & Kinnaman, 1995b). It is recommended that students be encouraged and supported to develop research projects using the Internet as a resource.

The majority (53.4%) of those teachers accessing the Internet only accessed the AgEd Network once or twice per week, with 19.2% accessing monthly. Since Internet access and time to use the Internet were the two biggest barriers reported in this study, the researchers recommend that teachers are provided with Internet access in their classrooms, and the Internet be made readily available during the teacher preparation time.

The Oregon Department of Education and Office of Professional Technical Education should be commended for instituting opportunities for teachers to access new technologies by funding the AgEd Network. It is the belief of the researchers that the AgEd Network was money well spent and other states should adapt this model of integrating technology for teachers. This concurs with findings (Gallo & Horton, 1994) that teachers need to learn how to acquire relevant information by learning to access the internet.

Additional research is needed to determine student use and achievement by using the Internet as an educational tool. Teachers indicated they had a positive perception of the Internet and the AgEd Network. Do students feel the same way, and does the Internet enhance student learning? Further research concerning student usage of the AgEd Network may help to determine Talbert's (1995) assertion that using the internet in the classroom enables students to develop critical thinking and problem solving skills.

Follow-up research on teacher usage of the AgEd Network after the grant program lapsed would help determine if the AgEd Network was sustainable and teachers considered this technology an important budget item for agriculture programs. More research is needed to study the effectiveness of the AgEd Network as a method of teaching technology with technology.

A similar study should be performed on pre-service teachers to determine the skills of students in teacher preparation programs on the Internet and their knowledge and perceptions of the AgEd Network. Future studies could determine if the AgEd Network is an effective method of teaching pre-service teachers the power of technology in the teaching and learning process (Mehlinger, 1996).

REFERENCES

Anderson, S. E., & Harris, J. B. (1997). Factors associated with amount of use and benefits obtained by users of a statewide educational telecomputing network. Educational Technology Research and Development, 45(1), 19-50.

Clinton, W. J. (1996). President Clinton's 1996 state of the union address. Available: http://www.whitehouse.gov/WH/New/other/sotu.html on Jan. 06, 1999.

Diem, R. A. (1984). Preparing for the technological classroom: Will we meet the challenge? Educational Technology, 24(3), 13-15.

Dyrli, O. E., & Kinnaman, D. E. (1995a). Connection classrooms: School is more than a place! What every teacher needs to know about technology. Part 5. Technology & Learning, 15 (8), 82-88.

Dyrli, O. E., & Kinnaman, D. E. (1995b). Gaining the online edge. Part 1: Energizing the classroom curriculum through telecommunications. Technology & Learning, 16(3), 79-84.

Faison, C. L. (1996). Modeling instructional technology use in teacher preparation: Why we can't wait. Educational Technology, 36(5), 57-59.

Fleck, K. (1994). The world's largest computer network: The Internet. The Agricultural Education Magazine, 67(2), 9-10.

Fletcher, E. W.,& Deeds, P. D. (1994). Computer anxiety and other factors preventing computer use among United States secondary agricultural educators. Journal of Agricultural Education, 35(2), 16-21.

Gallo, M. A., & Horton, P. B. (1994). Assessing the effect on high school teachers of direct and unrestricted access to the Internet: A case study of an East Central Florida high school. Educational Technology Research and Development, 42(4), 17-39.

Glenn, A. D., & Carrier, C. A. (1986). Teacher education and computer training: An assessment. Peabody Journal of Education, 64(1), 67-80.

Hignite, M. A., & Echternacht, L. J. (1992). Assessment of the relationships between the computer attitudes and computer literacy levels of prospective educators. Journal of Research on Computing in Education, 24(3), 381-391

Honey, M., &Henriquez, A. (1993). Telecommunication and K-12 educators: Findings from a national survey. New York: Center for Technology in Education, Bank Street College of Education.

Mathies, B. K., & Nelson, B. (1995). A network named Desire. Tech Trends, 40(1), 20-23.

ERIC

Mehlinger, H. D. (1996). School reform in the information age. Phi Delta Kappan, 77(6), 400-407.

National Research Council (1988). Understanding agriculture: New directions for education. Washington, D.C.: National Academy Press.

Oregon Department of Education (1997). Educational Technology Plan. Available: http://www.ode.state.or.us/inst/techplan/techplan.htm on Jan. 06, 1999.

Persky, S. E. (1990). What contributes to teacher development in technology? Educational Technology, 39(4), 34-38.

Rice, M. (1995). Issues surrounding the integration of technology into the K-12 classroom: Notes from the field. Interpersonal Computing and Technology: An Electronic Journal for the 21st Century, 3(1), 61-81. Available: http://www.helsinki.fi/science/optek/1995/n1/rice.txt on Jan. 6, 1999.

Riley, R. W. (1995). From the desk of the Secretary of Education: An action plan for educational technology. Teaching PreK-8, 26(3), 6.

Riley, R. W. (1996). Address to Congress. Available: http://www.ed.gov/Technology/Plan/NatTechPlan/letter.html on Jan. 6, 1999.

Sherman, L. (1998). Taking off: A teacher's guide to technology. Northwest Education, 3(3). (ERIC Document Reproduction Service No ED418689).

Siegel,J. (1994). Teach your teachers well. Electronic Learning, 13(7), 34.

Swortzel, K. A., & McCaslin, N. L. (1995). Getting information from webs and gophers: Who would have thought of that. The Agricultural Education Magazine, 67(11), 12.

Talbert. B. A. (1995). What to do if you're a model T on the information superhighway and you want to be a corvette. The Agricultural Education Magazine, 67(11), 13.

The MASTER Teacher. (1999, April 26). What every teacher needs to know about technology (Issue No. 32, Vol. 30). Manhattan, KS: DeBruyn, R. L.

Toffler, A. (1990). Powershift: Knowledge, Wealth, and Violence at the Edge of the 21st Century. New York: Bantam Books.

Willis, E. M. (1997). Technology: Integrated into, not added onto, the curriculum experiences in pre-service teacher education. Computers in the Schools, 13(1-2), 141-53.

ERIC

A CRITIQUE OF USING THE AGED NETWORK AS AN INSTRUCTIONAL TOOL TO INTEGRATE TECHNOLOGY IN THE CLASSROOM

A Critique

William L. Thuemmel
University of Massachusetts

The authors have selected and developed a timely research study of importance to teachers everywhere. With support from the Oregon Department of Education, statewide site licenses that provided access to the AgEd Network were purchased for every agriculture teacher in the state. Science teachers in schools with agriculture programs were also provided the same access. This assessment study was to determine if this two-million dollar investment by the State of Oregon accomplished the goals of assisting teachers to use the Internet more efficiently and incorporate more Internet resources into their classrooms after one year of AgEd Network access.

The introduction to the paper was comprehensive and well written. The authors cited more than 20 studies that were directly relevant to their research. They skillfully integrated the findings from previous research on this topic into a solid theoretical framework for their study. The purpose and objectives were clearly stated and achieved. The target population for this descriptive study included all agriculture teachers employed (N=105) in Oregon during spring 1998. A 93% response rate was attained. However, did the 105 teachers include both agriculture teachers and science teachers in schools with agriculture programs? The authors referred to Oregon Agricultural Science and Technology (AST) teachers, but did not define which teachers were included in the AST population.

The methods/procedures for the study were appropriately selected, implemented, and efficiently reported. Non-response error was controlled. Means and standard deviations were reported in tabular form. Figure 1, a bar chart, was used to illustrate the amount of time teachers perceived they accessed the AgEd Network; however, the difference between "valid percent" and "percent" should have been explained. This reviewer presumed that the percentages reported in the narrative findings are the "valid percents" from the study and the other "percents" represent those responses applied to the total population for the study; in other words, the 105 AST teachers in Oregon. Figures, like tables, should "stand alone" or be self-explanatory to the reader.

The factor of non-AgEd Network computer experience during the year of site access might have intervened in the teachers' perceptions when responding to the survey instrument's "before and after" questions. With the growth in computer usage among people in general, there are many sources of help, both online and off, for all computer users, including teachers. The researchers have relied on teacher perceptions for their findings, but those perceptions might have been funneled through the matrix provided by the survey questions. Perhaps more open-ended questions would have identified other tools that have helped the teachers to improve their integration of technology in the classroom during the time frame involved. One might reflect on how the results might have been even more significant if an intensive, hands-on workshop had been provided to the teachers at the time they received their site access to the AgEd Network.

The authors are to be commended for conducting a study of considerable contemporary interest to teachers and for surveying nearly all of the agriculture teachers in their state. Their paper was well written and contributes to the growing literature on the impact of using technology to improve teacher effectiveness in the classroom.

NAERC '99

Fresh from Florida

Higher-Order Thinking Skills versus Lower-Order Thinking Skills: Does Block Scheduling Influence Achievement at Different Levels of Learning?

M. Craig Edwards
Texas A & M University

Gary Briers
Texas A & M University

INTRODUCTION/THEORETICAL FRAMEWORK

Elmore (1995) stated, "Over the past decade the United States has been engaged in the most sustained period of educational reform since the Progressive Era" (p. 356). Evidence of impetus for this "reform" has been well documented by reports such as Prisoners of Time (1994) and Breaking Ranks: Changing an American Institution (1996). All of these reports called for a restructuring of the fundamental components of the American educational system, and frequently targeted "time" and its use in school-day scheduling patterns as a basic element that must be altered. Moreover, learning theorists (Bloom, 1974; Carroll, 1989) have stated that time and its use is a significant and essential component of student learning.

Cawelti (1997) concluded, "The most visible and perhaps significant change in the organization of the high school is the block schedule" (p. 41). DiRocco (1998/1999) asserted, "Intensive schedules [i.e., block scheduling] can be a powerful catalyst for change and for improved instruction in our secondary schools when implemented properly" (p. 83). Although, many "variations" of block scheduling exist (Canady & Rettig, 1995), the Modified A/B (Alternating Day) Block Schedule and the Nine-Week Accelerated (4X4) Semester Block

ERIC

Schedule are two predominate patterns. On the Modified A/B Block Schedule, the school day is divided into four instructional blocks of approximately 90 minutes each. Students alternate class attendance between "A" day classes and "B" day classes, and may be simultaneously enrolled for as many as eight different courses. On this schedule, most courses meet every other day for an 18-week semester. Conversely, on the Nine-Week (4X4) Block Schedule the school day is also divided into four instructional blocks of approximately 90 minutes each, but students attend the same four classes each day for the nine-week period.

Watson (1998) asserted, "In a block schedule, the [learning] tasks can be designed to take more time, be of greater depth, [and] require more inductive or higher-order thinking skills . . ." (p. 97). Torres and Cano (1995a) stated, "The use of thinking skills in problem situations is universally recognized as a prominent objective for all educational academies" (p. 46), including agriculture. Moreover, researchers Cano and Newcomb (1990) concluded that agriculture teachers "should purposefully create learning situations which assist in the development of higher cognitive abilities in students" (p. 51). Further, Torres and Cano (1995b) argued, "Cooperative learning, integrating higher-order thinking skills into the current curriculum, and a more constant use of the problem-solving approach to teaching are but a few means by which we can excel in teaching higher-order thinking skills" (p. 9).

Concerning thinking behaviors, Bloom, Engelhart, Furst, Hill, and Krathwohl (1956) described six levels of cognition, that is, levels of thinking often referred to as Bloom's Taxonomy. This approach to describing thinking behaviors delineated cognition into lower- and higher-order thinking skills and conceptualized them in a hierarchical fashion (Bloom et al., 1956; Cano & Martinez, 1989; Newcomb & Trefz, 1987; Torres & Cano, 1995a; Whittington, Stup, Bish, & Allen, 1997). Using Bloom's model as a framework, agricultural educators Newcomb and Trefz (1987) developed a similar model for classifying cognitive behaviors that consist of "four levels of learning": remembering, processing, creating, and evaluating (Figure 1).

Whittington et al. (1997) stated, "Research supports the theory that thinking at higher levels of cognition (thinking critically) is an indispensable skill and must be reinforced in schools" (p. 47). However, block scheduling has been accompanied by limited and somewhat conflicting results regarding its effect on student thinking skills and student achievement (North Carolina Department of Public Instruction, 1996; Wortman, Moore, & Flowers, 1997). Researchers Shortt and Thayer (1998/1999) asserted, "How time is used in the classroom and what the relationship may be between classroom instructional time and learning are two variables that need additional study to determine the correlation between time and student achievement as they relate to block scheduling" (p. 81).

Ware and Kahler (1988) concluded "that teaching critical thinking is important in vocational agriculture programs" (p. 283). In support of this conclusion, Cano and Martinez (1989) recommended, "Students of vocational agriculture should be challenged to develop stronger cognitive abilities and critical thinking abilities at higher levels through the instruction they receive" (p. 364). However, Cano (1990) stated that there was "a paucity of findings regarding vocational education students' level of cognitive performance. Specifically, research in determining the level of cognitive performance of vocational agriculture students was lacking" (p. 74). Further, Whittington (1995) recommended that additional research was needed to investigate non-teacher variables that may be influencing the level of cognition obtained during instruction.

ERIC

North Carolina researchers (Kirby, Moore, & Becton, 1996) found agriculture teachers to be "neutral or undecided" (p. 357) when responding to the statement "Student achievement has improved with block scheduling" (p. 358). Two comparable Texas studies (Connor, 1997; Lindsey, 1997) found similar results. However, researchers in Kentucky (Brannon, Baker, Morgan, Bowman, & Schmidt, 1999) concluded, "Agriculture teachers agreed that as a result of block scheduling learning is more meaningful for all students . . ." (p. 197). Yet, little is known about the effects of school-day scheduling pattern on secondary-level agricultural education and its potential for influencing the cognitive development of students (Kirby et al., 1996; Wortman et al., 1997). Is there a difference in student achievement for students enrolled in an agriscience course, depending on the block-scheduling pattern?

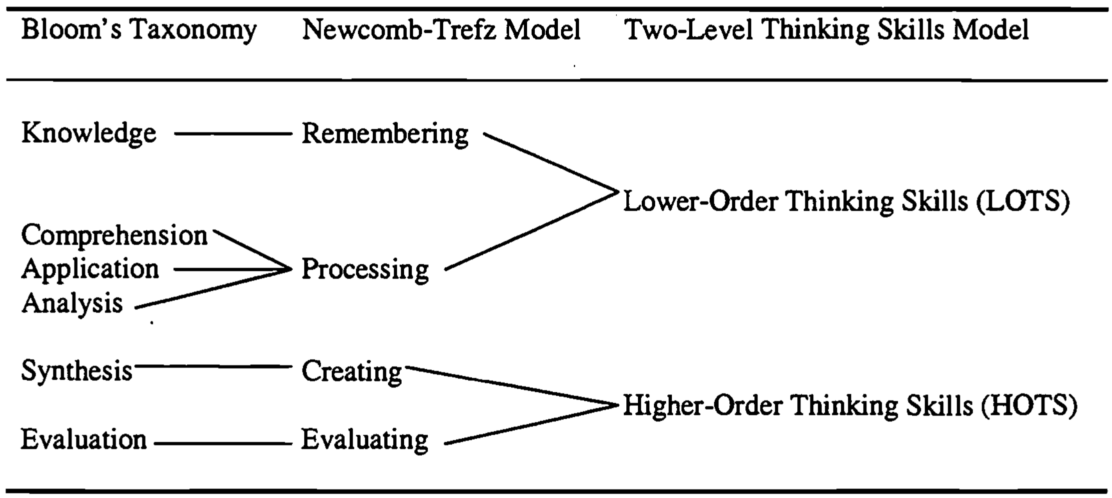


Figure 1. A Comparison of Bloom's Taxonomy, Newcomb-Trefz Levels of Learning Model, and a Two-Level Thinking Skills Model (Extended from a comparison of Bloom's Taxonomy and the Newcomb-Trefz Model (Whittington, 1995) Journal of Agricultural Education)

PURPOSE/RESEARCH QUESTIONS

The purpose of this study was to compare the higher- and lower-order thinking skills achievement of students enrolled for a secondary-level course in animal science, across two school-day scheduling patterns. These research questions guided this study: (1) What are selected characteristics of students enrolled in and instructors teaching a secondary-level course in animal science? (2) What is the level of achievement for higher-order thinking skills, as described by Newcomb and Trefz (1987), for students enrolled in animal science? a) Does level of achievement for higher-order thinking skills of students on a Modified A/B (Alternating Day) Block schedule differ from that of students on a Nine-Week Accelerated (4X4) Semester Block schedule? (3) What is the level of achievement for lower-order thinking skills, as described by Newcomb and Trefz (1987), of students enrolled in animal science? a) Does level of achievement for lower-order thinking skills of students on a Modified A/B (Alternating Day) Block schedule differ from that of students on a Nine-Week Accelerated (4X4) Semester Block schedule? (4) Do moderator variables, e.g., student and teacher variables, explain variation in

student achievement, and does scheduling pattern significantly explain variation in student achievement after effects of moderator variables have been removed?

METHODS/PROCEDURES

This research was a descriptive study that employed the causal-comparative method to describe and explore possible cause-and-effect relationships between school-day scheduling patterns and the achievement of intact groups. Gall, Borg, and Gall (1996) stated that, "the major advantage of the causal comparative method is that it allows us to study cause-and-effect relationships under conditions where experimental manipulation is difficult or impossible" (p. 383).

The target population (Gall et al., 1996) consisted of students enrolled in and the instructors teaching the agriscience course Animal Science (AGSC 332) in Texas public schools during the fall of 1998. Schools that had offered/taught the course Animal Science (AGSC 332) for the school years 1996-97 and 1997-98 (n = 388) were obtained from the Texas Education Agency and served as the sampling frame.

The "experimental units" for this study were individual agriscience classes and teachers, but individual students were the sampling units within an agriscience class. This was a form of cluster sampling, which, according to Gall et al. (1996) "is used when it is more feasible to select groups of individuals rather than individuals from a defined population" (p. 227). The responding sample consisted of 22 "volunteer" teachers and schools, representing two different school-day scheduling patterns, i.e., 12 Modified A/B Block scheduled schools with 189 students and 10 Nine-Week (4X4) Block scheduled schools with 136 students. Because the data for this study were provided by a volunteer sample, the results are generalizable only to subsequent similar volunteer samples.

The students completed a two-part instrument. Part one consisted of selected demographic items, e.g., length of FFA membership. The second part of the instrument was an end-of-course achievement examination. Glaser (1963) maintained that achievement tests were appropriate for determining "the degree to which the student has attained criterion performance" (p. 519). The examination was developed from recommended curriculum materials for the agriscience course Animal Science (AGSC 332) (Instructional Materials Service, n.d.; Instructional Materials Service, 1998).

The examination included 56 multiple-choice items selected for content validity in the areas of nutrition, reproduction, health, and management of domestic animals. Three agricultural educators—a curriculum specialist, a classroom teacher, and a measurement specialist—reviewed the items for clarity and content. The examination was divided into two scales based on an extension of Newcomb and Trefz' (1987) "levels of learning" model (Figure 1). The two scales consisted of 33 higher- and 23 lower-order thinking skills items, respectively. The lower-order thinking skills (LOTS) portion of the examination was made up of remembering and processing items; the higher-order thinking skills (HOTS) scale contained items at the creating and evaluating levels of learning (Newcomb & Trefz, 1987). The Cronbach's coefficient alpha reliability estimate for the lower-order thinking skills scale was .79, while the higher-order thinking skills scale had a reliability estimate of .78. Finally, teachers responded to a

questionnaire that included selected multiple-choice items describing themselves and their schools.

A researcher-developed packet consisting of student questionnaires/examinations, teacher questionnaires, pre-coded scan sheets, and postage-paid return envelopes were mailed to the participating agriscience teachers. Due to varying end-of-course dates, two general mailings were necessary. Teachers administered the student questionnaires/ examinations and completed their questionnaires at or about the same time.

The student scan sheets were coded so that they could be identified with their particular teacher and school-day schedule. Upon return, the scan sheets were inspected to ensure the number codes were still intact. Following scanning, the data were entered into a Microsoft Excel 97 spreadsheet file and then imported into an SPSS 7.5 data file. T-tests were performed to compare means and explore differences for research questions two and three, with an a priori alpha of .05. Multiple regression analyses with hierarchical order of entry of predictor variables were performed to answer research question four.

RESULTS/FINDINGS

As seen in Table 1, slightly more than one-half of the participating students were male and nearly 46 percent were female. Almost three-fourths of the students were Anglo, while one-fourth identified themselves as "People of Color." Slightly more than one-third had never been an FFA member, and approximately two-thirds had been members for one or more years. Nearly 70% indicated at least "some experience" with domesticated animals, while three-in-ten said they had "little" or no experience (Table 1).

Slightly more than three-fourths of the teachers were male and nearly one-fourth were female (Table 1). Concerning their education, the teachers were evenly divided, that is, half held only a bachelor's degree while the other half had earned a master's degree (Table 1). Years of experience as an agriscience teacher was also evenly split with 50 percent of the teachers having taught 12 or fewer years, and 50 percent indicating 13 or more years of service. When asked about years of service at their current school, nearly six-in-ten replied that they had taught at their current school for 10 or fewer years, while slightly more than four-in-ten indicated 11 or more years of service (Table 1).

Table 1. Selected Characteristics of Students (N=325) Enrolled in and Instructors (N=22) Teaching Animal Science

Characteristic	n	Percent
	Students	
Gender[a]		
Male	173	53.2%
Female	149	45.8%
Ethnicity[b]		
Anglo (White Non Hispanic)	236	72.6%
People of Color	84	25.8%
FFA Membership[c]		
Never	115	35.4%
Less than one year	59	18.2%
Two years	63	19.4%
Three years	63	19.4%
Four years	23	7.1%
Experience with Domestic Animals[d]		
None	27	8.3%
Little experience	71	21.8%
Some experience	79	24.3%
Much experience	52	16.0%
Great experience	95	29.2%
	Instructors	
Gender		
Male	17	77.3%
Female	5	22.7%
Highest Level of Education		
Bachelor's degree	11	50.0%
Master's degree	11	50.0%
Years of Experience as an Agriscience Teacher		
1 – 12 years	11	50.0%
13 or more years	11	50.0%
Years of Service at Current School		
1 – 10 years	13	59.1%
11 or more years	9	40.9%

[a]Three students did not answer this question.
[b]Five students did not answer this question.
[c]Two students did not answer this question.
[d]One student did not answer this question.

ERIC Full Text Provided by ERIC

The higher-order thinking skill achievement mean for all students was M=33.69, SD=8.34 (Table 2) or less than half of the "conventional" 70% passing standard. Students on a Modified A/B schedule scored significantly higher (M=37.56, SD=8.72) than students on a Nine-Week (4X4) Block schedule (M=29.04, SD=5.04) (Table 2). Further, the lower-order thinking skill achievement mean for all students was M=36.42, SD=11.03 (Table 2) or slightly more than half of the "conventional" 70% passing standard. Students on a Modified A/B schedule scored significantly higher (M=41.09, SD=11.72) than students on a Nine-Week (4X4) Block schedule (M=30.82, SD=7.22).

Table 2. Means and Standard Deviations for End-of-Course Thinking Skills Achievement by Scheduling Pattern, (N=22)

School-Day Scheduling Pattern	n	Mean	SD
	Higher-Order Thinking Skills		
Modified A/B Block	12	37.56	8.72
Nine-Week (4X4) Block	10	29.04	5.04
Overall	22	33.69	8.34
	Lower-Order Thinking Skills		
Modified A/B Block	12	41.09	11.72
Nine-Week (4X4) Block	10	30.82	7.22
Overall	22	36.42	11.03

A t-test was conducted to compare the end-of-course achievement for higher-order thinking skills for the Modified A/B (Alternating Day) Block scheduled students versus those who were Nine-Week Accelerated (4X4) Semester Block scheduled (Table 3). This procedure produced a mean difference of 8.52, $t(18.04) = 2.86$, $p = .010$ (Table 3). The difference was significant at an alpha level of .05. That is, the higher-order thinking skill performance of students on a Modified A/B Block schedule was significantly superior to that of the Nine-Week (4X4) Block schedule students. Further, a t-test was conducted to compare the end-of-course achievement for lower-order thinking skills (Table 3). This procedure produced a mean difference of 10.27, $t(18.59) = 2.52$, $p = .021$ (Table 3). The difference was significant at an alpha level of .05. That is, the lower-order thinking skill performance of students on a Modified A/B Block schedule was significantly superior to that of the Nine-Week (4X4) Block schedule students.

Table 3. End-of-Course Thinking Skills Achievement: Contrast of Modified A/B versus Nine-Week (4X4) Block Scheduling

Source	Mean	Mean Difference	S.E.	t	df	sig.
		Higher-Order Thinking Skills				
Contrast[a]						
Modified A/B Block	37.56					
		8.52	2.98	2.86	18.04	.010*
Nine-Week (4X4) Block	29.04					
		Lower-Order Thinking Skills				
Contrast[a]						
Modified A/B Block	41.09					
		10.27	4.08	2.52	18.59	.021*
Nine-Week (4X4) Block	30.82					

[a]Contrast does not assume equal variances. *$p < 0.5$.

To determine if school-day scheduling patterns significantly explain variability in student achievement after the effects of selected student and teacher variables were removed, multiple regression analyses with hierarchical order of entry of variables were performed. These procedures were done to control initial non-equivalence in the two research groups. Correlation analysis revealed that there was a statistically significant relationship between the student variable length of FFA membership and end-of-course higher-order thinking skills achievement ($r = .46$). That is, the greater the length of time the student had been a member of the FFA, the better they performed on the higher-order thinking skills achievement examination. Moreover, similar analysis demonstrated that there was a statistically significant relationship between the teacher variable teacher tenure and higher-order thinking skills achievement ($r = .52$). As a teacher's length of tenure increased, the higher-order thinking skill achievement of their students increased. (The variable "teacher tenure" combined an instructor's years of experience as an agriscience teacher and their tenure at their current school. The resulting scale had a reliability coefficient estimate of .82.)

Therefore, because of positive associations with student achievement, these two moderator variables were entered into a multiple regression analysis equation as step one in a hierarchical order of entry procedure. Then, to determine if school-day schedules significantly explained additional student variability for end-of-course achievement, the scheduling pattern variable was entered in step two of the procedure. Thus, step two included the variable Modified A/B versus Nine-Week (4X4) Block.

In Table 4, step one portrays regression of the variable higher-order thinking skill achievement on the variables student FFA membership and teacher tenure. A statistically significant amount of student variability for higher-order thinking skill achievement was explained by this entry: $R^2 = .370$, $\underline{F} = 5.585$, $\underline{p} = .012$. But, when the variable Modified A/B versus Nine-Week (4X4) Block schedule was entered, there was not a significant contribution to the explanation of variance, R^2 Change = .069, $\underline{F} = 2.215$, $\underline{p} = .154$. Further, when the dependent variable lower-order thinking skill achievement was regressed on the independent variables entered in step one, i.e., student FFA membership and teacher tenure, the amount of variance explained was $R^2 = .245$, $\underline{F} = 3.083$ $\underline{p} = .069$ (Table 4), which was not significant at an alpha level of .05. The variable Modified A/B versus Nine-Week (4X4) Block schedule was entered into the regression equation in step two; it did not explain additional student variability for lower-order thinking skill achievement, R^2 Change = .073, $\underline{F} = 1.939$, $\underline{p} = .181$ (Table 4).

Table 4. Hierarchical Regression of Thinking Skills Achievement on Selected Student and Teacher Variables and School-Day Block Scheduling Pattern

Variable(s) Entered	R Square	R Square Change	F Change	Sig. of Change
	Higher-Order Thinking Skills			
Step 1				
Student FFA Membership and Teacher Tenure	.370	.370	5.585	.012
Step 2				
Modified A/B versus Nine-Week (4X4) Block	.439	.069	2.215	.154
	Lower-Order Thinking Skills			
Step 1				
Student FFA Membership and Teacher Tenure	.245	.245	3.083	.069
Step 2				
Modified A/B versus Nine-Week (4X4) Block	.318	.073	1.939	.181

CONCLUSIONS/IMPLICATIONS/RECOMMENDATIONS

Glaser (1963) contended that "achievement tests are employed to discriminate among treatments, that is, among different instructional procedures [e.g., scheduling patterns] by an analysis of *group* differences" (p. 520). This study compared the higher- and lower-order thinking skills achievement of students enrolled for a secondary-level course in animal science, across two school-day scheduling patterns.

The end-of-course higher-order thinking skill achievement for all students was less than half of the "conventional" 70% passing standard, while their lower-order thinking skill achievement was slightly more than half (Table 2). Webster and Miller (1998) found similar results for an animal science examination administered to high school seniors in 12 Midwestern States. They concluded that the students were not strongly intrinsically motivated to excel on the test, and that "this factor most likely explains why the students did not perform better on the exam" (p. 318). Moreover, was there a significant lack of "alignment" or "congruence" between the curriculum these students were actually taught and the course content on which they were eventually assessed? Hoyle, Steffy, and English (1994) suggested "the result of incongruence is normally lower test performance on the part of the students, particularly if the test has been selected because it was congruent with the written curriculum" (p. 98). The examination used in this study was based solely on the recommended curriculum materials for the agriscience course Animal Science (AGSC 332) (Instructional Materials Service, n.d.; Instructional Materials Service, 1998). Was this is a valid procedure if the requisite "alignment" did not exist?

The higher- and lower-order thinking skill performance of students on a Modified A/B Block schedule was significantly superior to that of the Nine-Week (4X4) Block schedule students (Table 3). Thus, it appeared that the Modified A/B schedule was superior to the Nine-Week (4X4) schedule. Yet, when multiple regression analyses with hierarchical order of entry were performed, and the moderator variables student length of FFA membership and teacher tenure were entered in step one, variability in higher-order thinking skills achievement was significantly explained (Table 4). However, in step two, when the scheduling pattern variable Modified A/B versus Nine-Week (4X4) Block was entered, there was no additional significant explanation of student variability (Table 4). Further, in the case of lower-order thinking skills achievement neither variable significantly explained student variability (Table 4). Thus, only with caution could one conclude that the Modified A/B pattern is the superior schedule. Recommendations for future practice and research include:

1) This study suggests that there may be an "incongruence" between the actual curriculum materials that teachers used to teach animal science and the recommended instructional materials. Hoyle et al. (1994) stated, "curriculum mapping can reveal what was taught, in what order, and for how long . . . " (p. 90). So, a form of "curriculum mapping" should be used to identify the curriculum materials used by the instructors for this course. It might also be useful to examine the relationship between this study's teachers' use of the recommended materials and the performance of their students.
2) This study should be "replicated" using quasi- or experimental design procedures that will control potential extraneous variables (i.e., student length of FFA membership and teacher tenure), and thereby improve the generalizability of future results.
3) Although with reservations, this study did find a significant difference in the performance of learners depending on which block schedule pattern they received instruction. Would this result have been similar for other agriscience courses? Mindful of this, it is recommended that this study be replicated for other agriscience courses.
4) This research could not significantly explain student variability for the end-of-course lower-order thinking skill achievement of students enrolled on a Modified A/B schedule versus those who received instruction on a Nine-Week (4X4) Block schedule. Are there other moderator variables that significantly explain this variability? It is recommended that further research be performed to identify this (these) variable(s).

5) In addition to the two patterns investigated by this study, it appears that there are numerous "variations" of block scheduling regimens (Canady & Rettig, 1995). Therefore, it is recommended that a two-part study be conducted. The purpose of the first part would be to identify and describe these varied block-scheduling patterns. Then, in part two one might conduct a comparative study to determine if there are significant differences in student achievement depending on the learner's school-day schedule.
6) Further, instructors teaching on a Modified A/B schedule may be exhibiting teaching behaviors that are related to their students' superior performance. Therefore, case studies should be conducted profiling the teaching behaviors of these instructors.

ERIC

REFERENCES

Bloom, B.S. (1974, September). Time and learning. American Psychologist, 29(9), 682-688.

Bloom, B. S., Engelhart, M.D., Furst, E. J., Hill, W.H., & Krathwohl, D.R. (1956). Taxonomy of educational objectives - handbook 1: Cognitive domain. New York: David McKay Company, Inc.

Brannon, T., Baker, A., Morgan, J., Bowman, K., & Schmidt, B. (1999). The impact of integration of vocational and academic activities on agricultural education in Kentucky. Proceedings of the 49th Annual AAAE Southern Agricultural Education Research Meeting, 49, 187-199.

Canady, R.L. & Rettig, M.D. (1995). Block scheduling: A catalyst for change in high schools. Princeton, NJ: Eye on Education.

Cano, J. (1990). The relationship between instruction and student performance at the various levels of cognition among selected Ohio production agriculture programs. Journal of Agricultural Education, 31(2), 74-80.

Cano, J. & Martinez, C. (1989). The relationship between critical thinking ability and level of cognitive performance of selected vocational agriculture students. Proceedings of the Sixteenth Annual National Agricultural Education Research Meeting, 16, 359-366.

Cano, J. & Newcomb, L.H. (1990). Cognitive level of instruction and student performance among selected Ohio production agriculture programs. Journal of Agricultural Education, 31(1), 46-51.

Carroll, J.B. (1989, January-February). The Carroll model: A 25-year retrospective and prospective view. Educational Researcher, 18(1), 26-30.

Cawelti, G. (1997). Effects of high school restructuring: Ten schools at work. Arlington, VA: Educational Research Service.

Connor, S. (1997). The influences of block scheduling in secondary agriculture science programs in East Texas. Unpublished master's thesis, Stephen F. Austin State University, Nacogdoches, TX.

DiRocco, M.D. (1998/1999). How an alternative-day schedule empowers teachers. Educational Leadership, 56(4), 82-84.

Elmore, R.F. (1995). Teaching, learning, and school organization: Principles of practice and regularities of schooling. Educational Administration Quarterly, 31(3), 355-374.

Gall, M.D., Borg, W.R., & Gall, J.P. (1996). Educational Research: An introduction (sixth edition). White Plains, NY: Longman Publishers USA.

Glaser, R. (1963). Instructional technology and the measurement of learning outcomes: Some questions[1]. American Psychologist, 18(8), 519-521.

Hoyle, J.R., Steffy, F.W., & English, B.E. (1994). Skills for successful school leaders (2nd edition). Arlington, VA: American Association of School Administrators.

Instructional Materials Service. (1998). Curriculum guide for animal science: Agriscience (second edition). College Station, TX: Texas A&M University.

Instructional Materials Service. (n.d.). Curriculum material for agriscience 332: Animal science (#8831B). College Station, TX: Texas A&M University.

Kirby, B., Moore, G., & Becton, L.K. (1996). Block scheduling's impact on instruction, FFA and SAE in agricultural education. Proceedings of the 1996 National Agricultural Education Research Meeting, 23, 352-361.

Lindsey, D.N. (1997). Influence of block scheduling on secondary agriculture science program components. Unpublished master's thesis, Tarleton State University, Stephenville, TX.

National Association of Secondary School Principals (NASSP). (1996). Breaking ranks: Changing an American institution. Reston, VA: Author.

National Education Commission on Time and Learning. (1994). Prisoners of time. Washington, DC: U.S. Government Printing Office.

Newcomb, L.H. & Trefz, M.K. (1987). Levels of cognition of student tests and assignments in the College of Agriculture at The Ohio State University. National Association of College Teachers of Agriculture Journal, 31(2), 26-30.

North Carolina Department of Public Instruction. (1996). Block scheduled high school achievement: Comparison of 1995 end-of-course test scores for blocked and non-blocked high schools. [On-line]. Available: <http://www.dpi.state.nc.us/block_ scheduling_report/> [October 16, 1997].

Shortt, T.L. & Thayer, Y. V. (1998/1999, December-January). Block scheduling can enhance school climate. Educational Leadership, 56(4), 76-81.

Torres, R.M. & Cano, J. (1995a). Examining cognition levels of students enrolled in a college of agriculture. Journal of Agricultural Education, 36(1), 46-54.

Torres, R. M. & Cano, J. (1995b). Increasing thinking skill through HOT teaching. The Agricultural Education Magazine 68(6), 8-9.

Ware, C.M. & Kahler, A.A. (1988). Teaching critical thinking as perceived by Iowa vocational agriculture instructors. Fifteenth Annual National Agricultural Education Research Meeting, 15, 280-287.

Watson, C. (1998). Instructional ideas for teaching in block schedules. Kappa Delta Pi Record, 34(3), 94-98.

Webster, J.K. & Miller, W.W. (1998). Articulating high school and university level agricultural courses: Implications for educators. Proceedings of the 25th Annual National Agricultural Education Research Meeting, 25, 310-320.

Whittington, M.S. (1995). Higher order thinking opportunities provided by professors in college of agriculture classrooms. Journal of Agricultural Education, 36(4), 32-38.

Whittington, M.S., Stup, R.E., Bish, L., & Allen, E. (1997). Assessment of cognitive discourse: A study of thinking opportunities provided by professors. Journal of Agricultural Education, 38(1), 46-53.

Wortman, J., Moore, G.E., & Flowers, J. (1997). Student's perceptions of block scheduling in agricultural education. Proceedings of the 1997 National Agricultural Education Research Meeting, 24, 440-447.

A CRITIQUE OF HIGHER-ORDER THINKING SKILLS VERSUS LOWER-ORDER THINKING SKILLS: DOES BLOCK SCHEDULING INFLUENCE ACHIEVEMENT AT DIFFERENT LEVELS OF LEARNING?

A Critique

William L. Thuemmel
University of Massachusetts

The researchers have tackled a rather complex study to determine possible relationships between acquisition of thinking (cognitive) skills by Texas high school students enrolled in animal science and the kind of school-day scheduling patterns (Modified Alternating Block or Nine-Week Accelerated Semester Block) used during their enrollment. The introduction/theoretical framework for the study was prepared in a concise, yet comprehensive, manner. Several major studies were cited, ranging from educational reform to block scheduling, to thinking skill acquisition, in laying the theoretical foundation for this quantitative study. The paper was well written.

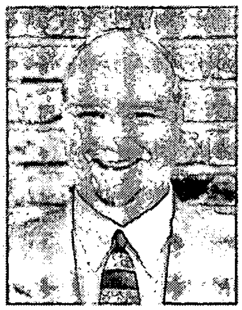
The purpose of the study was clearly stated. In order to accomplish this purpose, four research questions guided the research. A causal-comparative research method and multiple regression statistical technique were employed for this descriptive study. Students completed a two-part survey instrument. One part selected demographic items; the other, an end-of-course achievement examination. The authors cited Gall, Borg, and Gall (1996) in explaining their choice of research approach; in other words, "the major advantage of the causal comparative method is that it allows us to study cause-and-effect relationships under conditions where experimental manipulation is difficult or impossible" (p. 383). However, Borg et al. also cautioned that "the major disadvantage of the causal-comparative research design is that determining causal patterns with any degree of certainty is difficult" (p. 383). The latter was evident in the findings of this study--and the researchers did note that "only with caution could one conclude that the Modified A/B pattern is the superior schedule." Individual animal science classes and teachers were the "experimental units" for this study, but individual students were the sampling units within the selected class. The researchers explained their decision to use multistage cluster sampling by citing Borg et al. again--"is used when it is more feasible to select groups of individuals rather than individuals from a defined population" (p. 227). Not cited, and apparently not followed by the researchers, was the caution by Borg et al. that "conventional formulas for computing statistics on research data should not be used with samples chosen by cluster sampling" (p. 227). However, in fairness to the authors, they did state that "because the data for this study were provided by a volunteer sample, the results are generalizable only to subsequent similar volunteer samples." Perhaps even the latter are not generalizable? Given similar circumstances to conduct this study, are there other research approaches or statistical techniques available that might have enhanced the statistical power of those findings?

The researchers' conclusions/implications/recommendations for future practice and research seem appropriate and sufficiently cautionary. The authors are to be commended for exploring some possible relationships between acquisition of both higher-order and lower-order thinking skills and the potential influence of block scheduling. This paper raises some key issues that merit discussion.

NAERC '99

Fresh from Florida

Career Choices and Factors Influencing Career Change Among Agricultural Education Graduates



Bryan L. Garton
University of Missouri

D. Dwayne Cartmell II
University of Missouri

INTRODUCTION/THEORETICAL FRAMEWORK

Agricultural education programs at the secondary level must attract and retain high quality teachers to ensure a successful future (Vaughn, 1999). However, attracting and retaining certified agriculture teachers has been a problem facing the agricultural education profession through the years. Mattox (1974) concluded that a large percentage of prospective agriculture teachers, who had completed a teacher certification program, entered other careers or left teaching after a short period of time. In a study covering the past thirty years, Brown (1995) concluded that half of the agricultural education graduates from universities/colleges elected to not enter the teaching profession.

The shortage of certified agriculture teachers was not due to a lack of graduates with degrees in agricultural education, but was created by insufficient numbers of qualified individuals choosing to enter the teaching profession (Brown, 1995). Parmley, Bowen, and Warmbrod (1979) concluded the shortage reported by ongoing supply and demand studies was a result of a low percentage of graduates selecting the teaching profession, not lack of students in agricultural teacher preparatory programs. A national supply and demand study indicated an abundance of

agricultural education graduates were available to fill agriculture teaching vacancies (Camp, 1998). However, with fewer graduates choosing to become agriculture teachers, several schools across the country have had to terminate their secondary agricultural education programs.

Camp (1998) reported 51 schools across the United States were left without a qualified agriculture teacher in 1995. Camp also reported there were 625 new graduates qualified to assume secondary agriculture teaching positions. However, only 351 (56%) of those newly qualified were teaching secondary agriculture. Camp reported that of the more than 10,000 positions in secondary agricultural education programs in 1995, 10% of the agriculture teachers changed positions or careers at the end of the school year. With an overall shortage of agriculture teachers across the United States, it is important to gain an understanding of the factors associated with teachers leaving the profession, never entering the profession, and changing teaching positions.

Recent studies (Odell, Cochran, Lawrence & Gartin, 1990; Cano & Miller, 1992; Castillo, Conklin & Cano, 1998) have focused on the job satisfaction or dissatisfaction characteristics of agricultural education graduates. However, one question that has been raised in previous research but not addressed is: Why do agricultural education graduates leave teaching to pursue other careers?

Job satisfaction is one area that has been studied significantly as a contributing factor to teachers leaving the profession or never entering teaching. Job satisfaction can be described as "the condition of contentment with one's work and environment, denoting a positive attitude" (Wood, 1973). There is a positive correlation between job dissatisfaction and several factors, one of which is job turnover (Porter & Steers, 1973; Baum & Youngblood, 1975; Bartol, 1979). The relationship between job satisfaction and job dissatisfaction to training, turnover, and absenteeism is extremely important when trying to determine trends for teachers leaving the profession (Carrell, 1976).

Previous studies have shown a lack of job satisfaction can increase job turnover, absenteeism, and job burnout (Porter & Steers, 1973; Lawler, 1977; Davis & Newstrom, 1989). Cano & Miller (1992) noted it is not unreasonable to suggest teachers who leave the profession are less satisfied than those who do not leave. However, Odell, Cochran, Lawrence, and Gartin (1990) concluded job satisfaction is not purely dependent upon job related factors but family attributes play an important role in the satisfaction of teachers.

Based on the demand for qualified teachers and the theories of job satisfaction and family attributes, it becomes extremely important to look at specific and consistent issues that relate to the factors influencing a career change by agricultural education graduates. Teacher educators need to have an understanding of why graduates leave their selected careers or why they never enter their chosen profession. Teacher educators must determine if there are opportunities to curtail some of the factors influencing career change.

PURPOSE/OBJECTIVES

The purpose of this study was to investigate factors influencing agricultural education graduates to change careers or professions. In addition, this study sought to assess the employability skills needed by agricultural education graduates and to evaluate the contribution of the agricultural education curriculum in developing these skills. The following research objectives were formulated to guide the study:

1. Describe the employment and occupational status of agricultural education graduates.
2. Identify factors influencing graduates to change careers or occupations.
3. Assess the employability skills needed by agricultural education graduates.
4. Evaluate the contribution of the agricultural education curriculum to the development of employability skills.

METHODS/PROCEDURES

Population and Sample

The research method employed was descriptive survey. The population consisted of a census of agricultural education graduates ($\underline{N}$ = 105) at the University of Missouri from May 1989 through May 1998.

Instrumentation

A questionnaire with 67 forced-choice and three open-ended questions was developed by the researchers. The questionnaire consisted of six sections: educational status, occupational status, factors influencing position/occupational changes, educational experiences, program and advising, and open-ended questions. A panel of experts consisting of agricultural education faculty established content and face validity. Reliability was established by pilot testing the instrument with 16 senior agricultural education students. Cronbach's alpha coefficients ranged from .82 for the quality of academic advising section to .69 for the employability skills section.

Data Collection

The Dillman Total Design Method (Dillman, 1978) was followed for the data collection process. Postcards announcing the forthcoming questionnaire were mailed two weeks prior to mailing the complete questionnaire package which consisted of a cover letter, questionnaire, and pre-paid return envelope. Follow-up consisted of a postcard sent to all nonrespondents ten days after the mailing of the complete package. A second complete package was mailed to nonrespondents ten days after the follow-up postcard. A total of 81 graduates responded for a response rate of 77%. Nonresponse error was controlled by comparing late respondents to on-time respondents as outlined by Krushat and Molnar (1993) who noted late respondents tend to reply similarly to nonrespondents. A comparison of these groups revealed no differences in the responses of late and on-time respondents.

RESULTS/FINDINGS

The first objective sought to describe the employment and occupational status of the agricultural education graduates. A majority of graduates (87.7%) were employed full-time while a limited number (3.7%) were continuing their education on a full-time basis (Figure 1). A few of the graduates (3.7%) were continuing their education part-time and were employed. The remaining graduates (4.9%) were classified as other and included employed part-time and caring for family/home full-time.

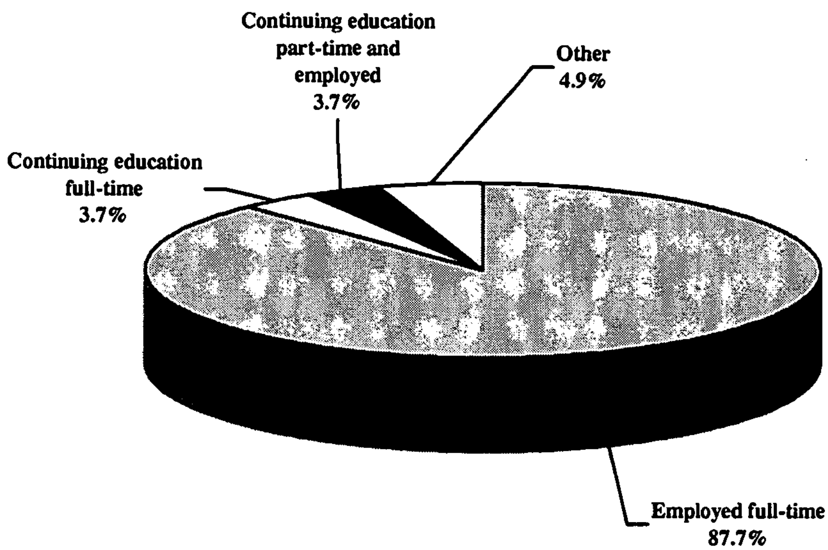
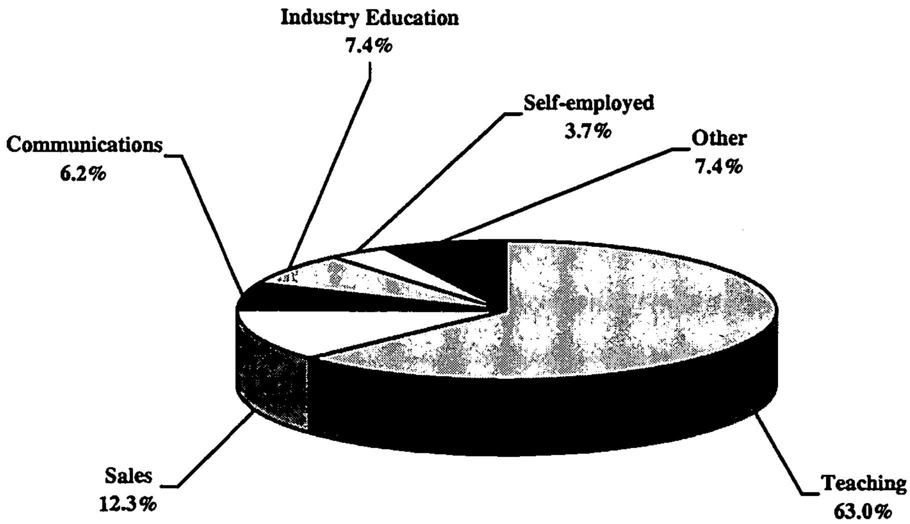


Figure 1. Employment Status (n = 81)

The agricultural education graduates held a variety of occupations. The greatest number of graduates (63%) were employed as secondary agriculture teachers (Figure 2). Graduates also reported being employed in the areas of sales (12.3%), communications (6.2%), and Industry education (7.4%). Industry education included extension, higher education, and technical support/service positions. A small number of graduates (3.7%) reported they were self-employed. Looking exclusively at graduates with teacher certification, approximately 90% taught secondary agriculture at some point in time and more than 75% indicated they were currently teaching in a secondary agriculture program.



~~Figure 2.~~ **Occupational Status (~~n~~ = 81)**

The second objective sought to identify factors that influenced graduates to change careers or change positions within the same career path. Approximately 50% (40) of the 81 graduates had changed careers or positions since their initial date of graduation. The graduates who had changed careers or positions were categorized into four groups. Twenty (50%) of the graduates were teaching in a different school than initially employed and seven (17.5%) began teaching then left to pursue another career (Table 1). Eight (20%) graduates had changed positions within the agricultural industry and five (12.5%) had left their industry position to pursue a career in teaching agriculture.

The most influential factor in making the decision to change teaching positions from one school to another was the location did not meet their preferred lifestyle (M = 2.7). Other influential factors included inadequate salary (M = 2.5); career goals/ambitions changed (M = 2.3); lack of employer support (M = 2.3); opportunity for advancement (M = 2.3); inadequate facilities-equipment (M = 2.3); burnout (M = 2.2); and working hours (M = 2.1).

BEST COPY AVAILABLE

Table 1
Factors Influencing Career or Position Change (n = 40)

	Changed Schools (n=20)			Left Teaching (n=7)			Changed within Industry (n=8)			Changed to Teaching (n=5)		
Factors	Rank	M	SD	Rank	M	SD	Rank	M	SD	Rank	M	SD
Location	1	2.70	1.53	8	1.17	0.41	4	2.25	1.49	7	1.20	0.45
Inadequate Salary	2	2.55	1.39	4	2.67	1.21	2	2.88	1.55	3	1.80	1.10
Career Goals	3	2.30	1.30	1	3.83	0.98	3	2.75	1.58	1	3.00	1.87
Facilities and Equipment	4	2.25	1.29	7	1.83	1.33	7	1.50	1.07	8	1.00	0.00
Employer Support	4	2.25	1.29	2	2.83	1.33	4	2.25	1.39	4	1.60	0.89
Advancement Opportunity	4	2.25	1.33	2	2.83	1.33	1	3.13	1.89	1	3.00	2.00
Burnout	7	2.15	1.31	6	2.33	1.75	6	1.63	0.92	4	1.60	1.34
Working Hours	8	2.10	1.29	5	2.50	1.64	7	1.50	0.76	6	1.40	0.55

Note. Scale: 1 = No Influence; 2 = Little Influence; 3 = Some Influence; 4 = Much Influence; 5 = Considerable Influence

A change in career goals/ambitions (M = 3.8) was the most influential factor for graduates who chose to leave teaching and pursue careers in industry. Other influential factors included lack of employer support (M = 2.8); opportunity for advancement (M = 2.8); inadequate salary (M = 2.7); working hours (M = 2.5); and burnout (M = 2.3). Inadequate facilities and equipment (M = 1.8) and location (M = 1.2) had little to no influence on their decisions.

Graduates changing positions within industry indicated an opportunity for advancement (M = 3.1) was the most influential factor in their decision. Other influential factors included inadequate salary (M = 2.9); career goals/ambitions (M = 2.8); employer support (M = 2.3); and location (M = 2.3). Burnout (M = 1.6); working hours (M = 1.5); and inadequate facilities and equipment (M = 1.5) had little to no influence on their decision to change positions within the agricultural industry.

Graduates changing to teaching from an industry position indicated career goals/ambitions (M = 3.0) and opportunity for advancement (M = 3.0) were the most influential factors for making a career move into teaching. Factors with little or no influence included inadequate salary (M = 1.8); and employer support, burnout, and working conditions (M = 1.6).

Several factors regardless of career change had no influence on changing positions. These factors included: preparation for the position, personality conflicts with co-workers, working conditions, expectations of the position, benefits such as healthcare and retirement, and spouse taking a different position.

The purpose of the third objective was to assess the employability skills needed by agricultural education graduates. Graduates were provided 15 employability skills and were asked to indicate the level of importance of each skill to the success of their occupation. For analysis purposes graduates were categorized into two career field areas: teaching and industry (Table 2).

Graduates currently in a teaching career indicated that verbal communication ($\underline{M} = 3.9$) was the most important skill for career success. Other high ranking skills needed for career success included leadership ($\underline{M} = 3.9$), written communication skills ($\underline{M} = 3.8$), getting along with people ($\underline{M} = 3.8$), planning and completing projects ($\underline{M} = 3.8$), analyzing information to make decisions ($\underline{M} = 3.8$), defining/solving problems ($\underline{M} = 3.8$), working cooperatively and as a team member ($\underline{M} = 3.7$), working with people with differing attitudes and opinions ($\underline{M} = 3.7$), and accessing and using a variety of information sources ($\underline{M} = 3.7$).

Graduates working in industry indicated that getting along with people ($\underline{M} = 3.8$) was the most important skill for success in their occupations. Other important skills needed for success included verbal communication ($\underline{M} = 3.8$), planning and completing projects ($\underline{M} = 3.7$), analyzing information to effectively make decisions ($\underline{M} = 3.7$), working with people with differing attitudes and opinions ($\underline{M} = 3.7$), defining/solving problems ($\underline{M} = 3.7$), written communication skills ($\underline{M} = 3.7$), leadership ($\underline{M} = 3.6$), accessing and using a variety of information sources ($\underline{M} = 3.5$), and working cooperatively and as a team member ($\underline{M} = 3.4$).

Table 2
Employability Skills Needed by Agricultural Education Graduates

Skills	Teaching (n=51) Rank	M	SD	Industry (n=29) Rank	M	SD
Using effective verbal communication skills	1	3.96	.20	2	3.83	.38
Using effective leadership skills	2	3.92	.27	8	3.66	.48
Using effective written communication skills	3	3.88	.33	7	3.72	.45
Getting along with people	3	3.88	.33	1	3.86	.35
Planning and completing projects	5	3.82	.39	3	3.79	.41
Analyzing information to effectively make decisions	6	3.80	.40	3	3.79	.41
Defining and solving problems	6	3.80	.45	5	3.76	.44
Working cooperatively in groups; working as a team member	8	3.78	.42	10	3.48	.69
Working with different attitudes and opinions	9	3.76	.47	5	3.76	.44
Accessing and using a variety of information sources	10	3.73	.53	9	3.55	.57
Appreciating and exercising the rights, responsibilities, and privileges of a citizen	11	3.49	.54	13	3.21	.73
Analyzing and drawing conclusions from various types of data	12	3.39	.63	10	3.48	.51
Understanding international (global) issues	13	3.22	.76	15	3.07	.65
Understanding the interaction of humans and the environment	14	3.10	.83	12	3.28	.70
Understanding and appreciating cultural and ethnic differences	15	3.06	.83	14	3.14	.74

Note. Scale: 1 = No Importance; 2 = Minor Importance; 3 = Moderate Importance; 4 = Major Importance

ERIC

The final objective sought to evaluate the contribution of the agricultural education curriculum to the development of the necessary employment skills. Graduates were provided 15 employability skills and were asked to indicate the agricultural education curriculum's contribution to the development of each skill. Again, graduates were classified as employed in either a teaching career or industry career (Table 3).

Graduate teaching agriculture at the secondary level indicated that the agricultural education curriculum had between a moderate and major contribution toward the developing skills in verbal communication ($\underline{M}$ = 3.4), written communication ($\underline{M}$ = 3.4), working cooperatively and as a team member ($\underline{M}$ = 3.3), leaderships ($\underline{M}$ = 3.2), accessing and using a variety of information sources ($\underline{M}$ = 3.2), defining/solving problems ($\underline{M}$ = 3.2), planning and completing projects ($\underline{M}$ = 3.2), and analyzing information to effectively make decisions ($\underline{M}$ = 3.0).

Graduates with positions in industry indicated that the agricultural education curriculum had between a moderate and major contribution toward the developing skills in written communication ($\underline{M}$ = 3.6), accessing and using a variety of information sources ($\underline{M}$ = 3.4), verbal communication ($\underline{M}$ = 3.3), getting along with people ($\underline{M}$ = 3.3), working cooperatively and as a team member ($\underline{M}$ = 3.2), leadership ($\underline{M}$ = 3.2), planning and completing projects ($\underline{M}$ = 3.1), analyzing information to effectively make decisions ($\underline{M}$ = 3.0), and defining/solving problems ($\underline{M}$ = 3.0).

Table 3
Contribution of Agricultural Education Curriculum in Developing Employability Skills

	Teaching (n=51)			Industry (n=29)		
Skills	Rank	M	SD	Rank	M	SD
Using effective verbal communication skills	1	3.47	.70	3	3.38	.73
Using effective written communication skills	2	3.43	.64	1	3.69	.54
Working cooperatively in groups; working as a team member	3	3.33	.68	5	3.24	.74
Using effective leadership skills	4	3.27	.70	6	3.21	.77
Accessing and using a variety of information sources	4	3.27	.78	2	3.41	.68
Defining and solving problems	6	3.25	.72	8	3.07	.88
Planning and completing projects	7	3.22	.61	7	3.17	.71
Analyzing information to effectively make decisions	8	3.06	.81	8	3.07	.75
Analyzing and drawing conclusions from various types of data	9	3.02	.73	10	2.93	.75
Working with different attitudes and opinions	10	2.96	.77	10	2.93	.84
Getting along with people	11	2.94	.83	4	3.34	.73
Understanding the interaction of humans and the environment	12	2.63	.77	13	2.62	.86
Appreciating and exercising the rights, responsibilities, and privileges of a citizen	13	2.57	.81	12	2.76	1.02
Understanding international (global) issues	14	2.33	.74	14	2.48	.63
Understanding and appreciating cultural and ethnic differences	15	2.22	.81	15	2.24	.79

Note. Scale: 1 = No Contribution; 2 = Minor Contribution; 3 = Moderate Contribution; 4 = Major Contribution

ERIC

CONCLUSIONS/RECOMMENDATIONS/IMPLICATIONS

Approximately 95% of the agricultural education graduates were gainfully employed, employed and continuing their education part-time, or continuing their education full-time. The remaining graduates were employed part-time or caring for their families in the home. The employment status of graduates provides evidence to the value of an agricultural education degree, whether that degree leads to employment opportunities or the pursuit of an advanced or professional degree.

A majority of the graduates were teaching agriculture at the secondary level and one-fourth of the graduates were employed in industry positions in the areas of sales, communications, and education. When considering only those who graduated in the teacher certification option, nine out of ten had taught at some point in their working career. Furthermore, three-fourths of these individuals indicated they were currently teaching agriculture at the secondary level. These findings exceed that a national study that indicated only 56% of newly certified teachers entered teaching (Camp, 1998). This implies that the individuals who selected the teacher certification option pursued a career in teaching at a higher rate when compared to national averages.

The opportunity for advancement, a change in career goals and ambitions, and inadequate salary had the greatest influence on the decision to change positions regardless of career path, teaching or industry. Graduates who left teaching at one school to pursue a position in another school indicated that location was the major factor influencing their decision. This would imply that individuals often accept a position outside their desired location and change when an opportunity becomes available. Often a location change is the result of the desire to move closer to a hometown or to a school with a stronger program.

Career goals and ambition was the number one factor influencing a career change for those who left teaching or took a teaching position after working in industry. It is important to note that burnout and working hours had little to no influence on graduates changing positions, regardless of career path. This finding is important since it is often hypothesized that burnout and working hours are major contributors to the loss of agriculture teachers. Additionally, it is important to note that preparation for the position and expectations of the position had no influence on career change decisions. This implies that the agricultural education degree prepared graduates for successful careers in teaching and industry.

In general, the employability skills needed by teachers of agriculture did not differ from those skills needed by graduates with careers in the agriculture industry. Using effective verbal communication skills was the highest rated employability skill. Ten of the fifteen employability skills were rated at or above 3.5, indicating that these skills had a major impact on the graduates' ability to successfully perform the responsibilities of their positions.

Graduates indicated that the agricultural education curriculum successfully prepared them for the employability skills needed for careers in teaching and industry. Of the ten employability skills rated as having a major impact on the ability to successfully perform the responsibilities of their job, graduates rated the agricultural education curriculum as having at least a moderate contribution to developing all ten skills.

The current findings give credence to the strength and versatility of the agricultural education curriculum in preparing individuals for careers in teaching and industry. The information gained from this study should be used in developing recruitment materials and promoting the degree program with potential students. The information should be shared with current students to dispel myths regarding the degree program and the agriculture teaching profession. Research regarding factors that influence teachers of agriculture to leave the profession should be expanded to the regional and national level to assist teacher educators in dealing with the shortage of agriculture teachers. Furthermore, research should be expanded to investigate the factors that influence people to enter and not enter the agriculture teaching profession.

ERIC Full Text Provided by ERIC

REFERENCES

Bartol, K.M. (1979). Individual versus organizational predictors of job satisfaction and turnover among professionals. Journal of Vocational Behavior, 15, 55-76.

Baum , J.F., & Youngblood, A.A. (1975). Impact of organizational control policy on absenteeism, performance, and satisfaction. Journal of Applied Psychology, 60, 688-694.

Brown, J.L. (1995). Patterns of supply and demand of teachers in agricultural education since 1965. Unpublished honors thesis, The Pennsylvania State University.

Camp, W.G. (1998). A national study of the supply and demand for teachers of vocational agriculture in 1995. Blacksburg: Agricultural and Extension Education, Virginia Tech.

Cano, J., & Miller, G. (1992). A gender analysis of job satisfaction, job satisfier factors, and job dissatisfier factors of agricultural education teachers. Journal of Agricultural Education, 33(3), 40-46.

Carrell, M. (1976). How to measure job satisfaction. Training, 13, 25-27.

Castillo, J.X., Conklin, E.A., & Cano, J. (1998). Job satisfaction among secondary teachers of agricultural education in Ohio. Proceedings of the 25th Annual National Agricultural Education Research Meeting, New Orleans, LA.

Davis, K. & Newstrom, J.W. (1989). Human behavior at work: Organizational behavior (8th ed.). New York: McGraw Hill.

Dillman, D.A. (1978). Mail and telephone surveys: The total design method. New York, NY: John Wiley & Sons.

Krushat, W.M., & Molnar, J.I. (1993). The effect of nonrespondents on a self-administered mail survey. Evaluation Practice, 14(1), 25-32.

Lawler, E.E. (1977). Job and work satisfaction. In W.C. Hamner & F.L. Schmidt (Eds.), Contemporary problems in personnel. Chicago: St. Clair Press.

Mattox, K.E. (1974, December). Why teachers quit. The Agricultural Education Magazine, 47(6), 140-142.

Odell, K.S., Cochran, J.E., Lawrence, L.D., & Gartin, S.A. (1990). The job and marital satisfaction of secondary agriculture teachers and their spouses. Journal of Agricultural Education, 31(3), 14-18.

Parmley, J.D., Bowen, B.E., & Warmbrod, J.R. (1979, August). The supply and demand of teachers of agriculture: Can the situation be explained. Paper presented at the annual meeting of the Central Region Conference in Agricultural Education, Manhattan, KS.

Porter, L.W., & Steers, R.M. (1973) Organizational, work, and personal factors in employee turnover and absenteeism. Psychological Bulletin. 80(2), 151-176.

Vaughn, R. (1999, January-February). Do we still need agricultural education? The Agricultural Education Magazine, 71(4), 4-5.

Wood, O.R. (1973). An analysis of faculty motivation to work in the North Carolina community college system. Unpublished doctoral dissertation, North Carolina State University, Raleigh.

CAREER CHOICES AND FACTORS INFLUENCING CAREER CHANGE AMONG AGRICULTURAL EDUCATION GRADUATES

A Critique

Jacquelyn P. Deeds
Mississippi State University

Each time the National Supply and Demand for Teachers in Vocational Agriculture is published the discussion rages for a time about why so few of our teacher education graduates actually enter teaching. The profession discusses the importance of recruiting students into university teacher education programs to fill the number of teaching positions that will be available in the years ahead. This study takes a serious look at the factors agricultural education graduates say influence their decision to teach or to remain in teaching. The answers to what keeps graduates teaching should be as important if not more important than how to recruit them in the first place.

The authors did an excellent job of addressing the research in profession related to the issue. Not just the research related to how many go into teaching but factors, such as job satisfaction, that may influence their continued success in the field. The study went beyond the title to determine employability skills needed by the graduates and the role their education played in developing those skills. These are answers to questions needed to modify programs but questions we are often afraid to ask.

The percentage of the University of Missouri agriculture education graduates from 1989-1998 teaching was 63% overall and 75% of those who had completed teacher certification. They also reported that 90% of the graduates that had been certified to teach did so at some point in the time span researched. This number is impressive when compared to the national average of 56% as reported by Camp in 1995. Some discussion of why the researchers thought Missouri graduates were different from the national average would have been enlightening and useful to those universities with different results.

The results were well reported with appropriate conclusions. They serve as a ringing endorsement for the University of Missouri program and should cause others in the profession to focus on their own program. The study should provide the basis for further study within the profession and information vital for the all-important recruitment of students to fill the teaching ranks in future.

Camp, W.G. (1998). A national study of the supply and demand for teachers of agriculture in 1995. Blacksburg: Agricultural and Extension Education, Virginia Tech

NAERC '99

Fresh Florida

The Principal Components of the Motivator-Hygiene Theory of Ohio Agricultural Education Teachers

Jaime Castillo
The Ohio State University

Jamie Cano
The Ohio State University

INTRODUCTION/THEORETICAL FRAMEWORK

Judge, Hanisch, and Drankoski (1995) suggested that it was imperative for human resource managers "to be aware of those aspects within an organization that might impact most employees' job satisfaction, and to enhance those aspects because, in the long run, the results will be fruitful for both the organization and the employee" (p. 576). According to Lawler, the level of job satisfaction among employees in an organization has had profound effects among organizations (as cited in Cano & Miller, 1992). Lawler, (as cited in Cano and Miller 1992, p. 40), wrote that, "the research evidence clearly shows that employees' decisions about whether they will go to work on any given day and whether they will quit are affected by their feelings of job satisfaction." Other researchers have commented as to the effects of job satisfaction.

The most notable effects of job satisfaction were reported by Mowday (as cited in Padilla-Velez, 1993). According to Padilla-Velez (1993), employee turnover was the most consistent consequence of job satisfaction. Padilla-Velez (1993) added that turnover was associated with the unfavorable conditions which were placed upon an organization.

Turnover impacted organizations by:

1. increasing costs related to recruiting, selecting, and training new employees.
2. reducing the morale of employees who remained with the organization.
3. reducing relationships among employees.
4. projecting an unfavorable image the organization's stakeholders.
5. interrupting daily activities.
6. diminishing the opportunity for the organization to grow.

Mertler (1992), wrote that levels of job satisfaction among public school teachers had effects upon their students. According to Mertler (1992), the level of job satisfaction, as influenced by motivation, among public school teachers had implications for student achievement. Reyes and Madsen, and Holdaway (as cited in Mertler, 1992) wrote that satisfied teachers "tend to be more productive than dissatisfied teachers" (p.4). Mertler added that motivated teachers were more effective. Motivated teachers ultimately motivated their students more and produced greater student achievement. While no research was discovered which investigated the relationship between levels of job satisfaction and student achievement among agricultural education students, job satisfaction levels of agricultural education teachers had been investigated.

Castillo and Cano (1999) summarized the findings from several studies which reported the levels of job satisfaction among agricultural education teachers in Ohio. Three studies were reviewed, Newcomb, Betts, & Cano, (1987), Cano & Miller (1992), and Castillo, Cano, and Conklin, (1998) which revealed that over the past ten years Ohio agriculture teachers had remained satisfied with their jobs. Each of the studies reviewed gathered overall job satisfaction data utilizing the Brayfield-Rothe "Job Satisfaction Index" as modified by Warner (1973). The "Job Satisfaction Index" measured the levels of job satisfaction among Ohio agriculture teachers when all facets of their job was considered. Two of the studies reviewed, Cano and Miller (1992) and Castillo, Cano, and Conklin (1998), collected data with regard to the Herzberg, Mausner and Snyderman (1959) Motivator-Hygiene theory using Woods (1973) instrument. The Cano and Miller (1992) and Castillo et al., studies also investigated the relationship between overall job satisfaction levels of Ohio agriculture teachers and the Motivator-Hygiene theory.

The premise of Herzberg, Mausner and Snyderman's (1959) Motivator-Hygiene theory, a need-satisfaction model, was that jobs had specific factors which were related to job satisfaction or dissatisfaction. Judge, Hanisch, and Drankoski (1995), wrote that need satisfaction models reflected affective employee reactions based upon the relationship between an individual's desired, needed, or wanted outcome and the extent to which the work situation or organizational environment supplied the desired, needed, or wanted outcomes. Herzberg et al., reported that the job satisfying and dissatisfying factors were distributed among a dual continuum, and that although job satisfying factors were related to employee motivation, their absence did not necessarily cause job dissatisfaction. Moreover, Herzberg et al., reported that although the absence of hygiene factors could lead to job satisfaction, presence of the job dissatisfying factors did not necessarily lead to job satisfaction. The factors which facilitated job satisfaction were called motivator factors. The job satisfaction factors investigated were achievement, advancement, recognition, responsibility, and the work itself. Job satisfying factors were related to the job's content. The job dissatisfaction factors investigated were pay, working conditions,

supervision, company policy, and interpersonal relations. Job dissatisfying factors were related to the job's context. Researchers have highlighted upon Herzberg, Mausner, and Snyderman's (1959) description of the Motivator-Hygiene factors.

Padilla-Velez (1993, pp. 20-21) and Bowen (1980, pp. 13-14) provided the following description of the job motivator and hygiene factors identified by Herzberg, Mausner, and Snyderman (1959):

Recognition- Acts of notice, praise, or blame supplied by one or more superiors, peers, colleagues, management persons, clients, and/or the general public.

Achievement- Accomplishment of endeavors including instances wherein failures were incurred. Similarly, instances were included wherein neither success or failures were incurred.

Advancement- Designated an actual change in job status.

Salary- All sequences of events in which compensation plays a major role.

Interpersonal Relations- Relationships involving superiors, subordinates, and peers.

Supervision- The supervisor's willingness or unwillingness to delegate responsibility and willingness to teach subordinates.

Responsibility- Satisfaction derived from being given control of personal work or the work of others and/or new job responsibility.

Company Policy and Administration- Events in which some or all aspects of the company were related to job satisfaction.

Working Conditions- Physical working conditions, the facilities, and the quantity of work as related to job satisfaction.

The Work Itself- The actual job performance related to job satisfaction.

Judge, Hanisch, and Drankoski (1995) wrote that the causes of job satisfaction varied. Judge et al., added that the specific causes relevant to the level of job satisfaction among employees in an organization will vary between the interaction of the characteristics of the organization and the employee and the interaction between the two. There has been no attempt to describe the variance in overall job satisfaction of Ohio agriculture teachers by a linear combination of Herzberg, Mausner, and Snyderman's (1959) job satisfying and dissatisfying factors. Moreover, there has been no attempt to reduce the amount of job satisfying and dissatisfying variables into meaningful and interpretable components. Therefore, can principal components analysis be used to derive a lesser number of Herzberg's et al. job satisfying and dissatisfying variables that are meaningful and interpretable?

ERIC

PURPOSE AND OBJECTIVES

The purpose of this study was to determine if principal components analysis could be used to reduce the observed job satisfying factors (achievement, advancement, recognition, responsibility, and the work itself) and job dissatisfying factors (pay, working conditions, supervision, company policy, and interpersonal relations) to a lesser more meaningful and interpretable number of factors. The following research questions were formulated to guide this paper.

1. What was the age, gender status, highest degree earned, years of teaching at present school, and total years teaching of female and male Ohio agriculture education teachers?
2. What was the overall level of job satisfaction among female and male agriculture education teachers in Ohio?
3. What was Ohio female and male agriculture teachers' level of satisfaction with job satisfying (motivator) factors (achievement, advancement, recognition, responsibility, and the work itself)?
4. What was Ohio female and male agriculture teachers' level of satisfaction with job dissatisfying (hygiene) factors (pay, working conditions, supervision, company policy, and interpersonal relations)?
5. If principal components analysis could be used to reduce the number of observed job satisfying factors (achievement, advancement, recognition, responsibility, and the work itself) and job dissatisfying factors (pay, working conditions, supervision, company policy, and interpersonal relations) to a lesser more meaningful and interpretable number of factors, what were the names of the newly derived factors?
6. Were the identified principal components the same for the female and male agriculture teachers?

METHODS/PROCEDURES

Procedures

The population for this descriptive-correlational study was all secondary teachers of agriculture education in Ohio (N=534). The sample consisted of a random sample of male agriculture teachers (N=453, n=212) and a census of female agriculture teachers (N=81). The Krejcie & Morgan (1970) formula for determining sample size was used.

Instrumentation

The Brayfield-Rothe "Job Satisfaction Index," as modified by Warner (1973), was used to measure job satisfaction when all facets of the job were considered. The "Job Satisfaction Index" constituted Part I of the questionnaire.

Wood's (1973) instrument was used to assess the level of job satisfaction among secondary agricultural education teachers. Wood's instrument constituted Part II of the questionnaire and provided the basis for describing teacher perceptions of the following factors: achievement, advancement, recognition, responsibility, the work itself, supervision, salary, interpersonal relations, policy and administration, and working conditions. Part III of the questionnaire consisted of demographic variables.

Content and face validity were established by a panel of experts consisting of teacher educators, teachers of agriculture, and graduate students. The instrument was pilot tested with a group of agricultural education teachers not included in the sample. Cronbach's alpha was used to assess the reliability of the questionnaire. The reliability coefficient for Part I of the questionnaire was .88. The reliability coefficient for Part II of the questionnaire was .92.

Data Collection

Data collection followed Dillman's (1978) recommended procedures. In combination, the three separate mailings yielded an 80 percent response rate. There were no significant differences noted between early and late respondents (Miller & Smith, 1983).

Analysis of Data

Principal components analysis was used to determine if the job satisfying and dissatisfying variables could be derived into a lesser number of job satisfying and dissatisfying components that were meaningful and interpretable. Derived components were "interpreted" by a panel deemed to be specialists in social science research and human relations.

RESULTS/FINDINGS

Demographic Characteristics

The majority of agriculture teachers had attained a bachelors degree or higher. The mean age for female agriculture teachers was 33, while the mean age for male teachers was 42. Female teachers had 8.00 years of teaching experience while males averaged 16.00 years. Female teachers had been in their current teaching position an average of 6.50 years and male teachers 13.00 years. Approximately 22 percent (13) of the females had tenure, and 44 percent (74) of the male agriculture teachers were tenured.

Overall Job Satisfaction

Based on a five point Likert type scale with responses ranging from strongly disagree (1) to strongly agree (5), females provided a mean score of 4.03, while males provided a mean score of 3.92 on the overall job satisfaction scale.

Level of Satisfaction With Satisfying/Dissatisfying Factors

Woods' (1973) instrument was used to describe female and male agriculture teachers level of satisfaction with the job satisfying and dissatisfying factors. Based on a six point Likert type scale with responses ranging from very dissatisfied (1) to very satisfied (6), females provided the following mean scores with the job satisfying and dissatisfying factors: achievement, 4.40; advancement, 3.92; recognition, 4.07; responsibility, 4.51; work itself, 5.05; interpersonal relationships, 4.50; policy and administration, 3.67; salary, 4.04; supervision, 3.77; working conditions, 3.77.

Mean scores for male agriculture teachers' level of satisfaction, utilizing Wood's (1973) instrument were as follows: achievement, 4.44; advancement, 4.20; recognition, 4.25; responsibility, 4.59; work itself, 4.83; interpersonal relationships, 4.77; policy and administration, 3.97; salary, 4.19; supervision, 4.10; working conditions, 3.99.

Intercorrelations

For the female agriculture teachers, correlations between the job satisfying (motivator) and job dissatisfying (hygiene) factors ranged from negligible (-.001) to strong (.648) (Davis, 1971) (Table 1).

Table 1. Correlations Between Job Satisfying/ Dissatisfying Factors For Female Teachers.

	Ach	Adv	Rel	Pol	Rec	Resp	Sal	Super	Work	Cond
Ach	-	.504	.486	.468	.478	.209	.222	.427	.395	.440
Adv		-	.372	.519	.570	.284	.380	.561	.251	.393
Rel			-	.563	.488	.219	.278	.486	.363	.379
Pol				-	.648	.350	.519	.716	.320	.566
Rec					-	.393	.307	.520	.192	.512
Resp						-	.092	.319	.238	.422
Sal							-	.330	.281	-.001
Super								-	.584	.457
Work									-	.249

For the male agriculture teachers, correlations between the job satisfying (motivator) and job dissatisfying (hygiene) factors ranged from low (.170) to very strong (.758) (Davis, 1971) (Table 2).

Table 2. Correlations Between Job Satisfying/ Dissatisfying Factors For Male Teachers.

	Ach	Adv	Rel	Pol	Rec	Resp	Sal	Super	Work	Cond
Ach	-	.365	.552	.461	.376	.467	.164	.355	.609	.318
Adv		-	.532	.595	.523	.483	.390	.536	.446	.397
Rel			-	.655	.616	.485	.319	.618	.510	.432
Pol				-	.606	.572	.419	.758	.383	.509
Rec					-	.455	.353	.685	.397	.440
Resp						-	.296	.516	.395	.401
Sal							-	.447	.170	.321
Super								-	.357	.462
Work									-	.416

Initial Solution

The eigenvalues, percentage of total variance explained by each component, and the cumulative percent of variance explained by each component for the female and male teachers are presented in Table 3.

Extraction of Components

The researchers utilized two considerations to determine the number of principal components to retain. First, Kaiser criterion was considered. Kaiser criterion suggests retaining principal components with eigenvalues greater than one (1). Second, Stevens (1992) suggested retaining principal components that account for at least 70% of the total variance. For the female agriculture teachers, the first component had an eigenvalue of 4.68, the second component had

an eigenvalue of 1.14, and the third principal component had an eigenvalue of .93 (Table 3). Although the third component was less than 1, the researchers chose to retain the third variable. The cumulative variance of the first through third principal components for the females accounted for 67.58% of the variance in the original data set (Table 3). For the sample of male teachers, the first component had an eigenvalue of 5.19, the second had an eigenvalue of 1.10, and the third principal component had an eigenvalue of .69 (Table 3). However, the first through third components accounted for 69.94% of the variance in the original data set (Table 3). Therefore, for the sample of male teachers, the researchers chose to retain three (3) principal components.

Table 3. Eigenvalues, Percent of Variance Explained, and Cumulative Variance Explained By Each Principal Component For Female and Male Teachers.

Eigenvalue			Percent of Variance		Cumulative Percent	
Component	Female	Male	Female	Male	Female	Male
1	4.68	5.19	46.80	51.92	46.80	51.92
2	1.14	1.10	11.47	11.07	58.27	62.99
3	.93	.69	9.30	6.94	67.58	69.93
4	.81	.64	8.11	6.41	75.69	76.34
5	.63	.58	6.30	5.86	81.99	82.21
6	.56	.52	5.68	5.26	87.68	87.48
7	.45	.40	4.56	4.01	92.25	91.49
8	.35	.33	3.52	3.31	95.77	94.81
9	.29	.31	2.97	3.17	98.75	97.99
10	.12	.20	1.24	2.00	100.00	100.00

Communalities

Component communality values for the female population of agriculture teachers and the sample of male agriculture teachers are as follows, respectively: achievement .49, .75; advancement .61, .55; relationships .49, .71; policies .77, .77; recognition .75, .69; responsibilities .48, .51; salary .80, .76; supervision .72, .80; work itself .91, .79; and working conditions .74, .65.

Unrotated Factor Loadings

Unrotated factor loadings of the 3-component models for the population of female (n=59) and male teachers (n=170) are presented in Table 4.

ERIC Full Text Provided by ERIC

Table 4. Unrotated Factor Loadings for the Female Teachers (n=59) and Male Agriculture Teachers (n=170).

	Female (n=59) Component			Male (n=170) Component		
Variable	1	2	3	1	2	3
Policy	.85	.09	.19	.85	.17	.16
Supervision	.81	.12	.22	.82	.29	.23
Recognition	.77	.18	.35	.77	.16	.26
Advancement	.72	.06	.27	.74	.09	.02
Relationships	.69	.08	.09	.81	.12	.22
Achievement	.69	.02	.12	.64	.58	.03
Conditions	.66	.54	.05	.64	.04	.48
Responsibility	.49	.49	.06	.71	.07	.07
Salary	.48	.69	.30	.52	.54	.45
Work Itself	.55	.28	.73	.64	.56	.26

Rotated Components

Stevens (1992, p. 381) suggested the following with regard to orthogonal and oblique rotation. "The preferred course of action is ... to rotate both orthogonally and obliquely. When on the basis of the latter it is concluded that the correlations among the factors are negligible, the interpretation of the simpler orthogonal solution becomes tenable." Given this recommendation the researchers chose to rotate both orthogonally and obliquely. Upon observation of both the orthogonal and oblique solutions, the researchers chose to interpret the orthogonal solutions (Tables 5 & 6). The data pertaining to the total variance explained by the obliquely rotated components for the female (n=59) and the males (170) of agriculture teachers is presented in Table 7.

Table 5. Orthogonally Rotated Solution For Female Agriculture Teachers (n=59).

	Component		
Variable	1	2	3
Salary	.832		
Policies	.705		
Advancement	.662		
Recognition	.615		
Relationships	.442		
Conditions		.827	
Responsibility		.679	
Work Itself			.946
Supervision			.607
Achievement			.427

Table 6. Orthogonally Rotated Solution For Male Agriculture Teachers (n=170).

Variable	Component 1	Component 2	Component 3
Supervision	.839		
Policies	.791		
Recognition	.788		
Relationships	.713		
Advancement	.585		
Responsibility	.563		
Work Itself		.852	
Achievement		.807	
Salary			.818
Conditions			.646

Table 7. Percent of Variance Explained and Cumulative Percentage of Variance Explained By The Retained Components For Female (n=59) and Male (n=170) Agriculture Teachers.

	Percent of Total Variance		Cumulative Percent	
Component	Female	Male	Female	Male
1	25.84	33.96	25.84	33.96
2	23.53	21.05	49.37	55.00
3	18.22	14.93	67.58	69.94

Interpretation Of Rotated Components

Tabachnick and Fidell (1989) suggested that as a rule of thumb, loadings with an absolute value of .30 or greater be used to specify variables that load on each component. For the population of female teachers (n=59) the following job satisfying and dissatisfying variables loaded on component number one (1): salary (.832); policies (.705); advancement (.662); recognition (.615); relationships (.442). The variables conditions (.827) and responsibility (.679) loaded on component number two (2). Last, the variables work itself (.946), supervision (.607), and achievement (.427) loaded on component number three (3). The researchers, along with a panel of specialists, named component number one (1) "people", component number two (2) "conditions", and component number three (3) "work itself" for the population of female agriculture teachers.

For the male teachers (n=170) the following variables loaded on component number one: supervision (.839); policies (.791); recognition (.788); relationships (.713); advancement (.585); and responsibility (.563). The variables work itself (.852) and achievement (.807) loaded on component number two (2). Last, the variables salary (.818) and conditions (.646) loaded on component number three (3). The researchers, along with the same panel of specialists for the female population, named component one (1) "people", component number two (2) "work itself", and component number three (3) "conditions".

CONCLUSIONS/IMPLICATIONS/RECOMMENDATIONS

Overall, male agriculture teachers were significantly older, had significantly more years of teaching experience, and had been in their current position significantly longer than female teachers of agriculture in Ohio (Castillo, Conklin, Cano, 1998). These findings imply that female agriculture teachers remain a small portion of the agriculture teachers in Ohio. It is recommended that the Ohio State Department of Education, appropriate agriculture education teacher educators, and the Ohio Vocational Teachers Association develop a specific program to enhance recruitment and retention of female agriculture teachers in Ohio.

The data indicated that the agriculture teachers were satisfied with their jobs. The agriculture teachers did not differ significantly in their overall job satisfaction level (Castillo & Cano, 1999). Moreover, Castillo and Cano (1999) reported that Ohio agriculture education teachers had remained satisfied with their jobs over the last ten years. The overall job satisfaction data in the current study implied that Ohio agriculture teachers, overall, were acquiring their wants, needs, and values from their jobs as they pertained to job satisfaction. The researchers recommend further investigation of Ohio agriculture teachers using the Warner's (1973) modified version of the Brayfield-Rothe "Job Satisfaction Index" and an alternative instrument to investigate the concurrent validity of the "Job Satisfaction Index".

Female teachers reported being least satisfied with the policies, supervision, and working conditions. Female teachers reported being most satisfied with the work itself. These findings imply that female teachers are least satisfied with the context in which their jobs are carried out. The level of satisfaction with the work itself indicated the female teachers were most satisfied with the content of their job.

Male teachers reported being least satisfied with the working conditions and policies. Male teachers reported being most satisfied with the work itself. Similar to the population of female teachers, male teachers were least satisfied with the context in which their job was carried out and most satisfied with the work itself.

The data with regard to female and male teachers' level of satisfaction with the satisfying and dissatisfying aspects of their job lend support to the Motivator-Hygiene theory. Agriculture teachers in Ohio are satisfied with some aspects of their jobs and dissatisfied to a lesser degree with others. The researchers recommend conducting further studies of job satisfaction of Ohio agriculture teachers using a stratified random sample to measure the level of satisfaction with job satisfying and dissatisfying factors as a whole, rather than by gender. A stratified random sample would allow generalization to the population of agriculture teachers in Ohio, thereby allowing the amendment of aspects leading to job satisfaction for the population, rather than gender specific.

Observation of the job satisfying and dissatisfying factor correlation matrices for the agriculture teachers in Ohio revealed that there were correlations which ranged from negligible to very strong (Davis, 1971). The researchers concluded that principal components analysis should be used in attempt to obtain a more parsimonious set of job satisfaction and dissatisfaction factors which were meaningful and interpretable. Moreover, the researchers chose to retain three components based upon initial eigenvalues and the initial amount of variance which was retained by the first three components for the population and sample of agriculture teachers.

ERIC

The researchers concluded that principal components analysis could be used to derive a lesser amount of components. Upon observation of the orthogonally rotated solutions, the researchers, along with a panel of specialists, named the components "people", "conditions", and "the work itself" for the population of female agriculture teachers. The same panel named the components for the sample of male agriculture teachers "people", "the work itself", and "conditions". The data implied that the variable loadings for female and male agriculture teachers were different. Therefore, subsequent analysis using the derived components in multiple regression analysis would have to be conducted separately. The implications of the loadings further revealed that upon subsequent multiple regression analysis using derived components, those components which could possibly explain the variance in overall levels of job satisfaction would be different. Therefore, the researchers recommend investigating overall teacher job satisfaction using a stratified random sample of agriculture teachers, rather than a census of female teachers and a sample of male teachers. This would allow researchers to suggest amending aspects of the teachers' job as a whole.

REFERENCES

Bowen, B. E. (1980). Job satisfaction of teacher educators in agriculture. Unpublished doctoral dissertation, The Ohio State University, Columbus.

Cano, J., & Miller, G. (1992). A gender analysis of job satisfaction, job satisfier, and job dissatisfier factors of agricultural education teachers. Journal of Agricultural Education, 33(3), 40-46.

Castillo, J. X., & Cano, J. (1999, February). A meta-analysis of Ohio agriculture teachers' level of job satisfaction. Paper presented at the AAAE Central Region Research Conference & Seminar in Agricultural Education, St. Louis, Missouri.

Castillo, Conklin, & Cano (1998, December). Job satisfaction among secondary teachers of agricultural education in Ohio. Paper presented at the National Agricultural education research meeting, New Orleans, Louisiana.

Davis, J. A. (1971). Elementary Survey Analysis. Englewood Cliffs, NJ: Prentice Hall.

Dillman, D. A. (1978). Mail and telephone surveys: The total design method. John Wiley & Sons: New York.

Herzberg, F., Mausner, B., & Snyderman, B. B. (1959). The motivation to work. New York: John Wiley & Sons.

Judge, T. A., Hanisch, K. A., & Drankoski (1995). Human resource management and employee attitudes. In Ferris et al. (eds). In Handbook of Human Resource Management. Massachusetts: Blackwell Publishers Ltd.

Krejcie, R. V. & Morgan, D. W. (1970). Determining sample size for research activities. Educational and Psychological Measurement. 30, 607-610.

Mertler, C. A., (1992). Teacher motivation and job satisfaction of public school teachers. Unpublished master's thesis, The Ohio State University.

Miller, L. E., & Smith, K. (1983). Handling non-response issues. Journal Of Extension, 21. September/October.

Newcomb, L. H., Betts, S. I., & Cano, J. (1987). Extent of burnout among teachers of vocational agriculture in Ohio. The Journal Of The American Association of Teacher Educators in Agriculture, 28(1), 26-34.

Padilla-Vellez, D. (1993). Job satisfaction of vocational teachers in Puerto Rico. Unpublished doctoral dissertation, The Ohio State University.

Stevens, J. (1992). Applied multivariate statistics for the social sciences. (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum. pp. 374-407.

Tabachnik, B. G. & Fidell, L. S. (1989). Using multivariate statistics. (2nd ed.). New York: Harper Collins. pp. 597-677.

Warner, P. D. (1973). A comparative study of three patterns of staffing within the cooperative extension organization and their association with organizational structure, organizational effectiveness, job satisfaction and role conflict. Unpublished doctoral dissertation, The Ohio State University: Columbus.

Wood, O. R. (1973). An analysis of faculty motivation to work in the North Carolina community college system. Unpublished doctoral dissertation, North Carolina State University, Raleigh.

THE PRINCIPLE COMPONENTS OF THE MOTIVATOR-HYGIENE THEORY OF OHIO AGRICULTURAL EDUCATION TEACHERS

A Critique

Jacquelyn P. Deeds
Mississippi State University

The researchers provided an excellent discussion of the Motivator-Hygiene Theory and of the research related to the job satisfaction. Many individuals would find it a good reference to use in an administration or supervision course to discuss the theories for human resource management. They provided a good description of the job motivator and hygiene factors. However, a section in the theoretical framework related to the statistical procedures used later and their use with similar data might help the reader better understand the findings.

The researcher's purpose in this study was to look at the analysis technique that could be used to look at and interpret the hygiene factors, not to look at how the findings could be applied to the population of the study. The population provided a data set for the analysis and the researchers pointed out the interpretation concerns with using a sample of male teachers and the population of female teachers. A discussion of why the population of female teachers could be considered a sample for the use of inferential statistics was needed.

The conclusion that female teachers remain a small portion of the agriculture teachers in Ohio seemed incomplete. The conclusion was based on the findings that male teachers were older, had more years of teaching experience and had been current position longer. The discussion of the job satisfaction indicators related to the teacher's data set provided a background for the additional analysis. Based on the title of the article versus the identified purpose readers would probably be looking for more conclusions and recommendations related to the teacher data presented in the article.

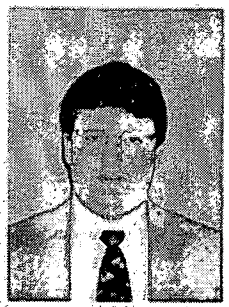
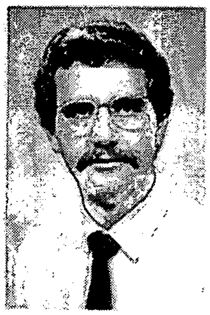
The advanced statistical analysis procedures should provide a basis for further discussion among the profession. How these procedures could be used in further studies in agricultural education need to be further developed in the implication portion of the article.

"The purpose of the study was to determine if principal component analysis could be used to reduce the observed job satisfying factors and job dissatisfying factors to a lessor more meaningful and interpretable number of factors." This article should generate discussion about the development of studies. Should the study and data dictate the statistical methods used or should the desired statistical analysis drive the design of the study?

ERIC

NAERC '99
Research Fresh from Florida

A Follow-up Study of Utah's 1994 and 1998 Agricultural Education Program Completer's Employment Status and Continuing Educational Participation

Nathan Helm
Utah State University

Gary Straquadine
Utah State University

INTRODUCTION/THEORETICAL FRAMEWORK

Funding has long been a part of agricultural education. In 1917, the Smith-Hughes Act began by providing federal dollars to be matched by the state. These monies were provided to promote the establishment of vocational education for present and future farmers. Since this time agricultural education has been encouraged by the Vocational Education Act of 1963, the Vocational Education Amendments of 1968 and 1976, and the Carl D. Perkins Vocational Education Act of 1984, including the 1990 Amendments. Agricultural education began by modeling farming and production agriculture. It was structured to reflect production agriculture during the early 1900's. However, through the Vocational Education Acts and amendments agricultural education has been challenged to meet the changing needs of their clientele (Phipps and Osborne, 1988).

ERIC

From the beginning, the Smith-Hughes Act designated that vocational education program's funding was "...that the controlling purpose of such education shall be to fit for useful employment..." (SEC. 10). In 1965, the United States Office of Education (USOE) publication, produced by a joint committee of the USOE and the American Vocational Association (AVA), listed the major program objectives for vocational agriculture:

1. To develop the agricultural competencies needed by individuals engaged in or preparing to pursue employment or entrepreneurial opportunities in agriculture.
2. To develop an awareness of the broad career opportunities in agriculture and the preparation needed to enter and progress in various agricultural occupations.
3. To develop the ability to advance in an agricultural occupation through a program of continuing education.
4. To develop those abilities in human relations which are essential in agricultural occupations.
5. To develop the leadership abilities needed to fulfill occupational, social, and civic responsibilities. (Joint Committee of the USOE and the AVA. *Objectives for Vocational and Technical Education in Agriculture.* Washington, D.C.: U.S. Government Printing Office, 1965.)

In each of the five above mentioned major program objectives for vocational agriculture two themes are expressly evident – occupational preparation and placement.

Agricultural education has been an important part of the early history of Utah education. In the early 1900's the federal congress investigated the need for vocational education and then enacted the Smith-Hughes Act of 1917. This Act directed vocational education to be offered with consistent standards and the intention of preparing youth for "useful employment" (SEC. 10). The direction provided by the Smith-Hughes Act was implemented in Utah schools as early as 1920 (Humphreys, 1965). From the time in which the Smith-Hughes Act was passed until 1990 there had been no legislative changes altering the purposes of vocational education funding in the United States and Utah. Yet, with the passage of the Carl D. Perkins Vocational and Applied Technology Education Act Amendments of 1990 placement in occupations became an option rather than mandate.

Today, in Utah, there are 65 programs with 89 teachers instructing approximately 10,000 students (W. L. Deimler, Specialist, Agricultural Education, Utah State Office of Education, March 1999). $92,183,608 was allocated to vocational education programs within the state of Utah during the 1997-1998 school year (Marvin Johnson, Utah State Office of Education, May 1999). Approximately nine percent, $8,176,699 came from federal funds. Of the approximate 92 million dollars, just over five percent, $4,962,578 was allocated specifically for agricultural education within Utah during the 1997-1998 school year.

ERIC Full Text Provided by ERIC

Utah has outlined its current goals for Utah Agricultural Science and Technology Programs. The first listed goal is - to prepare students for agriculture-related careers and occupations. The final goal listed is - to establish occupational choices, job seeking, and job retention skills for the enhancement of employability. Noticeably missing from the list of goals is placement in agricultural occupations. This is in contrast to the goals of the joint committee of the USOE and the AVA and the Smith-Hughes Act.

The guidelines provided in the Perkins Act Amendments outline the details regarding methods for demonstrating vocational program success. They allow each state the autonomy in deciding their system of accountability. All state systems used to measure accountability must include at least two sets of performance measures (Hoachlander, Levesque, and Rahn, 1992). One set must be measures of learning and competency gains, including student progress in the achievement of basic and more advanced academic skills. The other set must include any one of the following four measures: (1) competency attainment, (2) job or work skill attainment, (3) retention in school, or (4) placement in further education, the military, or employment.

Utah currently uses The Perkins Act amendments to their advantage. As they are no longer required to use placement to determine accountability they have shifted focus to skill certification. What then, should be the objectives of agricultural education programs in Utah? Should they include placement in occupations and education in agriculture? Are those developing or maintaining programs within the state aware of the various objectives for agricultural education they are responsible to provide?

Public funds have been allocated and spent with the intent of enhancing the preparation and skills of individuals completing agricultural education programs within Utah. The only logical intent for this education is placement in related occupations or continuing education in related fields. How does this modern day perspective rank agricultural education in Utah and in the nation?

The State of Utah, along with local sources, contributed $84,006,909 to vocational education programs within the state during the 1997-1998 school year (Marvin Johnson, Utah State Office of Education, May 19, 1999). An additional $8,176,699 came from federal funds. What have they (the state of Utah and the Federal Government) received for their expenditure? Has the state realized its goals or not? Are there measurable outcomes of the funding's impacts that allow a defensible assessment of how well the goals have been met? Are there obvious pluses that justify continuation of the effort? Are there any defects that suggest changes in the program are warranted? How do we measure or categorize agricultural education program success as a state? The answer appears to be to measure our current position in relation to program goals and observing positive progress.

PURPOSE/OBJECTIVES

The purpose of this study was to determine the employment status and participation in continuing education of agricultural education program completers. Furthermore, this study explored the relationships among variables assumed to influence placement and continuing education.

The specific objectives of this study were to:

1. Identify the occupational and/or educational status of Utah secondary agricultural program completers who graduated in 1994 and 1998.
2. Determine the relationship between Utah secondary agricultural program completers and their participation in an occupation and/or continuing education in agriculture and:
    a. Years enrolled in agricultural education
    b. Years of FFA membership
    c. Years conducting a supervised agricultural experience program
3. Identify whether or not 1994 and 1998 Utah secondary agricultural program completers differed in years enrolled in agricultural education, years with an SAE, years in FFA, or participation in an occupation and/or continuing education in agriculture.

METHODS/PROCEDURES

This study is descriptive-correlational. Correlational research is "research that attempts to determine the extent and the direction of the relationship between two or more variables" (Ary, Jacob and Razichek, p. 566). The independent variables in this study include (1) years enrolled in agriculture, (2) years of FFA membership, and (3) years conducting an SAE. The dependent variable was the classification of a program completer's achievement. Students responded to two questions to determine their category of achievement. The two questions – Are you currently employed in agriculture? Are you continuing education in an agriculturally related field? Three categories of achievement were identified. A response of yes was classified a one. A response of no was classified a two. Therefore, the category of achievement is a value of four if a respondent is currently neither employed in agriculture nor pursuing further education in agriculture. Additionally, if the respondent is employed in agriculture or pursuing further education in agriculture he/she has a value of three. Lastly, respondents employed in agriculture and pursuing further education in agriculture have a value of two. Achievement was classified as whether a student entered an agricultural occupation, continued education in agriculture or both. As a retrospective study – the presumed result (achievement) would occur after the presumed effects.

All public high schools or technical centers in Utah which offer agricultural education courses to high school age students in the 1994 and 1998 school year were included in the selection process. Each program was sent a letter requesting address information on their program completers graduating in 1994 and 1998. In total, 63 programs were sent requests. Program instructors were first sent the complete packet of information on the first week of September. A follow-up, reminder postcard was sent three weeks later. Another compete packet with a reminder

letter was sent five weeks after the original request was made. Lastly, a final reminder letter was sent four weeks later. A total of three follow-ups after the initial contact were completed. Of that, 27 programs, or 42.9 percent responded with usable information. Three programs, or 4.8 percent sent unusable information or indicated they were not able to supply information. A large proportion of programs (33 programs or 52.4 percent) ignored the request and chose not to respond.

Initially, students were sent an introductory letter with instructions and postage paid, survey postcard the third week of December 1998. A follow-up, reminder postcard followed three weeks later. To those who had not responded at this point, a final reminder letter with the postage paid, survey postcard was sent two weeks after the postcard reminder. All of the postcards were labeled with a four-digit number matching each student's name and address to allow responses to be checked with indicated names for validity. All students for which address information was collected were sent a letter and a return postage paid, survey postcard.

Questionnaire reliability was estimated at .85 for the employment – continuing education scales. The years enrolled, years of FFA membership, and years with an SAE had a reliability coefficient of .85.

RESULTS/FINDINGS

Students who graduated in 1994 and 1998 from Utah public schools and were agricultural program completers were the subjects of this study. Student names and addresses fitting this criteria were obtained from Utah agricultural instructors. Each instructor was sent a letter requesting address information on their program completers graduating in 1994 and 1998.

All students for which address information was collected were sent a letter and a return postage paid, survey postcard. Of the 664 addresses obtained from instructors 46 were returned as incorrect addresses. Of the remaining 618 surveys sent, 233 or 38 percent were returned. Of those responding, 19 were removed because they indicated they had completed zero or one year of agricultural education and therefore, were not program completers. This left 209 respondents for which data were analyzed.

Survey respondents identified their years enrolled in agricultural education, years of FFA membership, and years with an SAE. The majority of respondents (45.1%) enrolled in agricultural education for four years. Similarly, most respondents (40.7%) indicated they were in FFA for four years. Finally, 43.6 percent answered they had an SAE program for four years.

Early and late respondents were compared by year of graduation, years enrolled in agricultural education, years of FFA membership, years with an SAE, and participation in an occupation and/or continuing education in agriculture. Only year of graduation was significantly different at the $p = .05$ level. While 1994 graduates responded consistently between early (55%) and late (45%) respondents, 1998 graduates responded proportionally higher (77%) in the early wave and lower (23%) in the late wave.

The first objective was designed to identify the occupational and/or educational status of Utah agriculture program completers. Students were also asked to indicate their current

occupation. Of the 209 students who responded to the survey 148 or 70.8 percent indicated they were not employed in agriculture. When asked about continuing education plans, 159 or 76.1 percent of the respondents indicated they were not continuing education in an agriculturally related field. Table 1 displays the occupational and educational status of the respondents.

Table 1. Frequency and distribution of respondents regarding occupational and educational status.

Occupational and educational status	Frequency	Percent*
Continuing education in agriculture	50	24
Continuing education not in agriculture	56	27
Employed in agriculture	61	29
Employed but not in agriculture	102	49
Unemployed – Not seeking employment	54	26

* Total responses are greater than 100 as a result of rounding and multiple responses.

As indicated in Table 1, 78 percent of the completers are employed while 50 percent are continuing their education. However, employment in agriculture was less than 30 percent. Continuing education in agriculture was approximately 24 percent.

Achievement was identified to further define the characteristics of respondents in relation to their current occupation in agriculture and/or continued education in agriculture. As outlined in Table 2, of the 209 student respondents approximately 43 percent indicated they were employed in agriculture and/or continuing education in agriculture.

Table 2. Program completer's categories of achievement.

	Frequency	Percentage
Employed in Ag and Continuing Education in Ag	21	10.0
Either employed in Ag or Continuing education in Ag	69	33.1
Neither employed in Ag nor Continuing Education in Ag	119	56.9
Totals	209	100.0

Objective number two was designed to identify variables associated with Utah secondary agricultural program completers and their participation in an occupation and/or continuing education in agriculture. Three factors were used for this identification – years enrolled in agricultural education, years with an SAE, and years of FFA membership. Three Pearson Product Moment correlation coefficients were calculated as demonstrated in Table 3.

Table 3. Correlation between years enrolled in agricultural education, years of FFA membership and years with an SAE.

	Years enrolled	Years in FFA	Years with an SAE
Years enrolled	1.00	.75	.64
Years in FFA	.75	1.00	.71
Years with an SAE	.64	.71	1.00

An r-value of $r = .75$, statistically significant at alpha = .05, was found between years of FFA membership and years enrolled. The relationship between years of FFA membership and

years with an SAE was also statistically significant with an r = .71. The weakest relationship between the three was years with an SAE and years enrolled, r = .64. However, according to the conventions of Davis (1971) all three would be considered strong relationships.

The frequency and distribution of achievement with each of the following variables; years enrolled in agricultural education, years of FFA membership, and years with an SAE was calculated. The statistics are demonstrated in Table 4. This analysis demonstrated that as years increased so did the proportion of respondents. The majority of the respondents were in the lowest category of achievement, or, neither employed in agriculture nor continuing education in agriculture. The distribution of respondents in relation to categories of achievement remained nearly constant between each of the three variables. However, only years of FFA membership and years with an SAE showed statistical significance, p = .05, in relation to achievement. However, the strength of the relationships (r = .30 and r = .21) is of little practical significance. Of importance, though, is the fact that years enrolled in agricultural education had no statistical significance in relation to achievement, where p = .05.

The third objective was to compare 1994 and 1998 Utah secondary agricultural program completers in years enrolled in agricultural education, years of FFA membership, years with an SAE, and participation in an occupation and/or continuing education in agriculture (achievement). Using Chi-square, there was no statistically significant difference at p = .05 between 1994 and 1998 program completers and years enrolled in agricultural education, years of membership in FFA, years with an SAE, and participation in an occupation and/or continuing education in agriculture (achievement).

ERIC

Table 4. The frequency (n), distribution, and relationships of Utah program completer respondents by category of achievement and each of the following variables; years enrolled in agricultural education, years of FFA membership, and years with an SAE.

YEARS	Years enrolled in agricultural education by category of achievement						Years of FFA membership by category of achievement						Years with an SAE by category of achievement					
	(2.0)*		(3.0)*		(4.0)*		(2.0)		(3.0)		(4.0)		(2.0)		(3.0)		(4.0)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
0	0	0.0	0	0.0	0	0.0	0	0.0	4	5.9	1	.9	0	0.0	1	1.5	2	1.9
1	0	0.0	0	0.0	0	0.0	0	0.0	2	2.9	7	6.4	0	0.0	2	3.1	14	13.6
2	2	9.5	10	14.5	21	18.4	1	4.8	9	13.2	16	14.5	2	10.0	9	13.8	17	16.5
3	4	19.0	31	44.9	44	38.6	3	14.3	19	27.9	34	30.9	3	15.0	27	41.5	29	28.2
4	15	71.4	28	40.6	49	43.0	8	38.1	25	36.8	48	43.6	15	75.0	26	40.0	41	39.8
5							7	33.3	7	10.3	4	3.6						
6							2	9.5	2	2.9	0	0.0						
Totals (N=209)	**21**	100.0	**69**	100.0	**114**	100.0	**21**	100.0	**68**	100.0	**110**	100.0	**20**	100.0	**65**	100.0	**103**	100.0
	value		**df**		**p**		**value**		**df**		**p**		**value**		**df**		**p**	
Chi-Square	7.49		4		.11		36.20		12		.01		17.27		8		.02	
Cramer's V	.14		202		.11		.30		197		.01		.21		186		.02	

* Key – Categories of achievement

2.0 = Employed in agriculture and continuing education in agriculture.
3.0 = Either employed in agriculture or continuing education in agriculture.
4.0 = Neither employed in agriculture nor continuing education in agriculture

CONCLUSIONS

This study found that most Utah high school agricultural education students enroll in program courses are members of the FFA and have an SAE for four years.

The major conclusions of this study were:

1. This study found the majority of high school agricultural education program completers within the state of Utah are not entering occupations or continuing education in fields related to their agricultural training.
2. This study found that respondent's years of FFA membership and years with an SAE were related to participation in an occupation and/or continuing education in agriculture. However, it was determined, though statistically significant, the strength of the relationship demonstrated little practical significance. The teacher's role in the students' education, educational facilities, and presence of an agriculturally based community can be assumed to have a greater significance in placement or continuing education in agriculture.
3. This study found no statistically significant relationship between years enrolled in an agricultural education program and participation in an occupation and/or continuing education in agriculture.
4. This study found that there was no statistically significant difference between 1994 and 1998 Utah secondary agricultural education program completer respondents in the selected independent variables. The frequency distribution was equal among the two different years for the variables, years enrolled in agricultural education, years of membership in FFA, years with an SAE, and participation in an occupation and/or continuing education in agriculture.

Implications/Recommendations

It has been 17 years since a statewide follow-up study collected data regarding occupations and education following completion of a Utah secondary agricultural program. This lack of information regarding student status made it difficult to measure program accountability regarding funding and effort toward the standards or mandates outlined for the state as well as the nation. The unanswered question was, "Are current secondary agricultural program strategies and philosophies able to successfully place students in vocations or further education in agriculture?" The obvious answer is no. The state of Utah and the nation are faced a new question, what now? The answers appear to be three fold.

The obvious and simplest at the time being would be to do nothing different. Under the guise of limited placement and continuing education in agriculture, programs would continue to promote the traditions of vocational agriculture and receive funding for skill certification and padded placement numbers (or be lumped with other vocational programs to hide the lack of success in placement). In order to provide the numbers of students necessary to justify a program, instructors and districts would continue to offer a cafeteria approach to courses. Students would then be able to taste and sample from a variety of courses. One side effect being the inability to predict from year to year numbers of students in each course and maybe not having the ability to

predict which courses would be taught from year to year. All decisions would be placed in the hands of the students to choose the courses that they found most appealing.

An approach is to focus an agricultural program on avocational skills. The philosophy of the social reconstructionist is to change the perceptions and values society places on or with agriculture. Ag in the Classroom (AITC) has worked this avocational prospect to perfection. AITC integrates agricultural concepts into all of the basic educational realms. Distance from sources of food has placed the values of agriculture further from societies eye. Individuals sometimes believe that farmers or agriculturists are abusers of the land and that society could do without them. The use of federal funds to support avocational programs in agriculture has been approved by amendments to vocational acts. The avocational program could probably provide high school graduates with required humanities credits.

A last, most difficult approach is to develop a community-based, vocational, agricultural program that works to place its program completers in occupations in agriculture. This program would have to be highly programmatic. This program's success would be evidenced by their placement of students. In this program students would develop the specific skills necessary to place them successfully in vocations in agriculture. This program is limited by the community's needs for individuals in agricultural positions.

From the conclusions of this study, those in agricultural education should not continue to promote the concept that program completers are placed in agriculturally related occupations or continuing education. Further study is needed to assess the decisions made by program completers to pursue occupations or education outside of agriculture. Were those decisions based on limited opportunities? Or, were the skills developed by the student through their time in the agricultural program transferable to any choice they made?

State applied technology directors and legislators must use these data to challenge themselves to create positive ways to satisfy the need for high school agricultural education and vocational accountability. This can be best accomplished by further analysis of current positions followed by a forward-thinking readjustment of current goals and standards. Additionally, those accounting for agricultural education must alter the method of measurement to demonstrate areas for improvement while highlighting the benefits. As a profession we must find better ways to define success.

Success in agricultural education as well as all of vocational education has been based on placement and skill certification. What isn't being measured is quality of life. What are program completers contributing to society? Are we, as a community, state, or nation, better off for supporting such programs? Those who work hard each day in the classrooms and laboratories of high school agricultural education would say, yes. Furthermore, is a high placement rate an accurate measure of success? Or, because agricultural education program completers have been offered the opportunity to learn programmatically, in-depth, they are better prepared to positively impact society? These questions remain, at this time, unmeasured and unanswered.

ERIC Full Text Provided by ERIC

REFERENCES

Ary, D., Jacobs, L. C., and Razavieh, A. (1996). Introduction to research in education. (5^{th} ed.). Orlando, FL: Holt, Rinehart, and Winston.

Davis, J. A. (1971). Elementary survey analysis. Englewood Cliffs, NJ: Prentice-Hall.

Hoachlander, E. G., Levesque, K., and Rahn, M. L. (1992). Accountability for vocational education: A practitioners guide. Berkley, CA: National Center for Research in Vocational Education.

Humphreys, L. R. (1965). The early development of vocational education in agriculture in Utah. Salt Lake City, UT: Utah State Department of Public Instruction.

Phipps, L. J., and Osborne, E. W. (1988). Handbook on agricultural education in public schools. Danville, IL: The Interstate Printers and Publishers.

Smith-Hughes Act (Public Law No. 347, 64^{th} Congress, 1917).

A FOLLOW-UP STUDY OF UTAH'S 1994 AND 1998 AGRICULTURAL EDUCATION PROGRAM COMPLETER'S EMPLOYMENT STATUS AND CONTINUING EDUCATIONAL PARTICIPATION

A Critique

Jacquelyn P. Deeds
Mississippi State University

State Departments of Education have long used student placement and continuing education in agriculture to measure program success. We have all heard about programs that were discontinued or lost funding due to poor placement. What constituted placement in agriculture had been a frequent topic of discussion. Broad definitions of agriculture related were often used to improve placement figures. Problems with this measure of program success were addressed in this study

The theoretical framework presented in this study does a good job of capturing the history and changes that have defined student success. They address the liberalization of success measures for vocational education programs in the more recent legislation. They also provided a good background for this particular study in Utah.

The independent variables for the study were 1) years of enrollment, 2) years of FFA membership and 3) years of conducting an SAE. I would have appreciated some discussion as to why these particular variables were used. Also, no attempt was made to determine the quality of the FFA experiences or the extent of the SAE conducted. The study showed no significance in using these factors as predictors of success. Perhaps if the level of participation (member versus officer, etc.) or scope of the SAE (State or American FFA degree recipient versus Chapter degree) could have provided greater variability.

One would question the use of a reliability coefficient with demographic data. Because of the nature of the data collection the respondents were not a true sample but a convenience sample (those from programs where teachers were willing to respond with the appropriate addresses) the use of inferential statistics seems inappropriate.

In the conclusions section the authors indicate that if FFA and SAE were not factors in the career decision, then the educational facilities and an agriculturally based community are assumed to have greater significance in agricultural placement and education. The authors need to provide readers with a basis for that assumption. Many the implications and recommendations seemed to go beyond the scope of the study presented. More discussion and application of the results of our research is often needed however one must stay focused on the study being reported.

Student placement and continuing education in agriculture will continue to be a significant issue to the profession. It is important to add to the body of knowledge in the area.

ERIC

NAERC '99

Fresh Florida

Cognitive Abilities of Preservice Teachers: A Longitudinal Study in Agricultural Education

Robert M. Torres
New Mexico State University

INTRODUCTION

The speed of technological advances and the demands they place on people will require them to function independently. As such, teaching students to think well and think for themselves has not had the same urgency it has today. Many national documents related to education (i.e., *A Nation at Risk*, 1983; *America 2000*, 1991; *Goals 2000*, 1994; *Seven Priorities of the USDE*, 1997) have espoused the need to develop students who can exercise thinking skills. Most directly targeted to vocational-technical education was the 1991 *Secretary's Commission on Achieving Necessary Skills* (SCANS) report, which argued for the need to direct attention to and strengthen students' abilities in three foundation areas including thinking skills. The other foundations are basic skills and personal qualities. Bloom and his associates (1956) offered perhaps the most convincing reason for developing thinking skills. They indicated that teachers have the task of preparing individuals for challenges that cannot be foreseen. All that can be done under such conditions is to help students acquire intellectual abilities and skills that will serve them well in new situations. Simply put, students must be prepared to respond to questions and problems that await them "around the corner."

THEORETICAL FRAMEWORK

"Thinking skills" is used herein as an umbrella term for a range of higher-order intellectual powers including critical thinking, reasoning, problem-solving, decision making, and creative thinking (Torres & Cano, 1995). Costa (1997) defined thinking as the manner in which individuals use intellectual behaviors in response to questions and problems to which they do not immediately know the answer. He added that students must call upon their store of knowledge and experiences as sources of data to support, theories to explain, or processes to solve each new challenge (Costa, 1997).

The literature highlights several variables associated with developing thinking skills. They can be grouped into environmental variables (Perkins, 1995; Ennis, 1985), student-related variables (de Bono, 1993; McKeachie, 1994), and teacher-related variables (Whimbey & Whimbey, 1976; Davis, 1993; McKeachie, 1994; Costa, 1997).

From this literature, perhaps the most pervading influence for developing thinking skills in students is the teacher. Dalzell (1997, p. 5) argued that "teachers who themselves are effective thinkers and who are worthy models to emulate serve their students well." Baumfield (1997) supported this claim when she stated that the teacher needs to be able to model explicitly for students how to solve problems, make decisions, and reason. Effective teachers model what they espouse, and thinking skills are no exception (Costa, 1997). However, teachers are less likely to teach students to think if they themselves lack the skill (Gibbs, 1997). Consequently these teachers are unable to model the desired thinking behaviors. Given this premise, assessing the thinking skills of teachers is important. Currently, research is lacking in agriculture education in this problem area. Therefore, providing baseline data pertaining to preservice teachers' thinking skills would be fruitful to agricultural education.

PURPOSE AND OBJECTIVES

The purpose of the study was to explore and describe agriculture preservice teachers' cognitive abilities. The objectives for the study were:

1. Describe the characteristics of preservice teachers as to gender, ethnicity, and age.
2. Describe the cognitive ability of preservice teachers across academic content areas.
3. Describe the cognitive ability level of preservice teachers.

METHODS/PROCEDURES

The study was designed using descriptive survey methods. The target population was preservice teachers enrolled in agricultural education. The accessible population was senior-level preservice teachers enrolled in agricultural education at New Mexico State University. A longitudinal study was undertaken using a convenience sample of preservice teachers. Class rosters from a senior-level teaching methods course during 1995, 1996, 1997, and 1998 served as the frame for the study. The combined number of preservice teachers was 69.

The *Developing Cognitive Abilities Test* (DCAT), a timed test, was used to assess the cognitive ability of students in three academic content areas and three cognitive levels (Beggs & Mouw, 1989). The three academic content areas were verbal, quantitative, and spatial skills, each

ERIC

area consisting of 27 items. The three cognitive levels --basic, application, and critical thinking, (each with 27 items), --were measured using items in the three academic content areas. In total, there were 81 items. The three cognitive levels were consistent with the first five levels of thinking skills categories of Bloom's taxonomy for cognition (Table 1): knowledge, comprehension, application, analysis, and synthesis (Bloom, Englehart, Furst, Hill, & Krathwohl, 1956). The developers deleted the evaluation level of Bloom's taxonomy because it did not contribute to the intent of the DCAT (Beggs & Mouw, 1989).

Table 1. Comparison of Bloom's Taxonomy and the Developing Cognitive Abilities Test

Bloom's Categories	DCAT Levels
Knowledge Comprehension	Basic Cognitive Ability
Application	Application Cognitive Ability
Analysis Synthesis	Critical Thinking Ability

The developers established the validity and reliability of the DCAT. The DCAT *Technical Manual,* authored by Wick (1990), details the procedures and criteria for constructing the test and the measures for establishing content validity. The test manual also outlines the reliability estimates for each section of the DCAT. Reliability estimates, expressed as Kuder-Richardson-20 as a measure of internal consistency, for the verbal, quantitative, and spatial content areas were .80, .84, .75, respectively. Also reported were reliability estimates for the basic, application, and critical thinking cognitive levels at .81, .76, .75, respectively, Overall, the reliability estimate for the DCAT was .90 (Wick, 1990). Data on preservice teacher characteristics were gathered by accessing student records.

Data were collected during the period preservice teachers were enrolled in the teaching methods course. The senior-level course met during the fall semester of each academic year at the same time and in the same location. The DCAT was distributed and administered by the researcher according to the procedures outlined in *Directions for Administration* booklet provided by the developers. The classroom environment remained the same for each data collection period.

Data were analyzed using SPSS/pc. Frequencies, percent, mean, standard deviation, and range were used to describe the data. Because of the purposive sampling technique, no attempts are made, nor should be made, to generalize these data to other preservice teachers.

RESULTS

Characteristic data is reported in Table 2 profiling the 69 preservice teachers. The majority of preservice teachers were White males. Hispanic preservice teachers represented approximately 23 percent of the respondents, with small percentages represented by African and American Indian preservice teachers. The age of preservice teachers ranged from 21 to 56 years. The average age was approximately 28 with the majority of preservice teachers falling within a 7½ year range.

Table 2. Characteristics of Preservice Teachers (n=69)

Characteristic	Frequency	Percent	Mean	Std. Dev.	Range
Gender					
Female	23	33.3			
Male	46	66.7			
Ethnicity					
White	49	71.1			
Hispanic	16	23.2			
African	3	4.3			
American Indian	1	1.4			
Age			27.9	7.51	21-56

Preservice teachers' cognitive abilities scores were gathered on three academic content areas (verbal, quantitative, and spatial). The verbal section of the DCAT sought to measure the literal understanding and appropriate use of words and phrases. This section also measured the perception of interrelationships among series of statements by making inference from context or forming conclusions through propositional reasoning about given information (American Testronics, 1990).

The quantitative section measured the functional understanding of arithmetic operations, basic geometric concepts, and the ability to apply mathematical principles in the solution of story problems. This section also measured the ability to transform given information into new relationships required for the solution of problems (American Testronics, 1990). The third section, spatial content, measured the recognition and retention of object characteristics such as size, shape, symmetry, and pattern. Also measured in the spatial section is the ability to estimate what would occur when one or more objects change in location or position. Furthermore, the spatial section measured the ability to mentally transform objects through imagination of the identification of the parts resulting from dividing an object.

For each of the measured areas, a maximum raw score of 27 (one point per item) was possible. In each of the 27 item content areas, nine were at each of the three cognitive levels (basic, application, critical thinking). Table 3 provides the results of preservice teachers' cognitive abilities on the three academic content areas.

Preservice teachers were most successful in the verbal content area of cognitive abilities. Conversely, preservice teachers were most challenged by cognitive abilities in the spatial content area. Individual raw scores for each content area varied as represented by the standard deviations and ranges reported in Table 3.

Table 3. Cognitive Ability of Preservice Teachers Across Content Areas (n=69)

Academic Content Area*	Mean	S.D.	Range
Verbal	20.6	3.54	11-27
Quantitative	17.0	4.40	5-27
Spatial	13.1	3.57	6-22

Note. *Maximum possible raw score was 27.

Cognitive abilities of preservice teachers were assessed at three levels–basic (knowledge, comprehension), application, and critical thinking (analysis, synthesis). For each of the cognitive abilities levels, a maximum raw score of 27 (one point per item) was possible. Each cognitive abilities level contained 27 items in the three academic content areas (verbal, quantitative, and spatial). Table 4 presents the results of preservice teachers' cognitive ability at the three levels of cognition.

As a group, preservice teachers scored relatively equally in each of the three levels of cognition. However, preservice teachers were slightly more competent in application- type items, reporting a mean of 18.4. Conversely, preservice teachers were slightly more contested at critical thinking type items, reporting a group mean of 14.9. There was an equal amount of variation in raw score for each of the cognitive levels as indicated by the standard deviation and range scores (Table 4).

Table 4. Cognitive Ability of Preservice Teachers (n=69)

Cognitive Level*	Mean	S.D.	Range
Basic	17.4	3.47	7-25
Application	18.4	3.41	8-26
Critical Thinking	14.9	3.69	6-23

Note. *Maximum possible raw score was 27.

CONCLUSIONS AND IMPLICATIONS

Since the formation of public education, no other student outcomes have been more cherished than a student's ability to reason, solve problems, and think independently. Secondary agricultural education programs a have successful history in promoting the development of these skills and abilities in students. However, student success can be attributed to many dynamic and interrelated factors. For decades, researchers have investigated a myriad of antecedents that contribute to the development of thinking skills. The teacher is one antecedent few would dispute leads to successful student outcomes.

Research indicates that teacher-related factors such as their philosophical beliefs (Blane, 1969), professional preparation (McMillan, 1987), cognitive expectation (Pickford, 1988), instructional delivery (McKeachie, 1994), and the nature of their tests and assignments (Miller,

1989) leads to the development of higher-order thinking skills in their students. Yet Gibbs (1997) offers a major premise that teachers who do not possess a particular skill themselves are less likely to teach it. Should this premise hold true, teachers' ability to exercise and promote higher-order thinking will impact students' ability to develop these thinking skills and abilities themselves.

This study sought to investigate the thinking skills of preservice teachers in agricultural education. Thus far, the data presented herein serve as a benchmark for identifying preservice teachers' thinking skills and abilities. This benchmark data indicate that preservice teachers have greater success in verbal skills and abilities as compared to quantitative and spatial skill areas. Also, in terms of cognitive skills and abilities, preservice teacher experienced equal success in basic and application thinking skills and abilities when compared to critical thinking skills and abilities. Yet as one invokes the premise that teachers are more likely to teach skills they, themselves, can perform, the implications of these data are wide and varied.

One implication is that these preservice teachers are likely to contribute to student outcomes related to verbal skills and abilities more so than outcomes related to quantitative and spatial content areas. These data further imply preservice teachers' capacity for integrating academic skills into the agricultural curriculum--an outcome strongly encouraged by education leaders. A second implication from these data suggests that when teaching, preservice teachers are more likely to emphasize basic and application thinking skills and abilities than skills and abilities requiring critical thinking.

RECOMMENDATIONS

These implications affect teacher education. Is it enough to teach preservice teachers how to develop higher-order thinking skills in student if they, themselves, do not possess the capacity to exercise these skills and abilities? What does this mean for preservice teacher program design and instruction? At first glance, it might be recommended that teacher educators in agricultural education reassess the nature and scope of courses required for degree completion. Holding the course instructor constant, do the nature and scope of the prescribed courses provide preservice teachers an opportunity to develop the essential academic, technical, and higher-order thinking skills, traits strongly desired of them as future teachers? Furthermore, while educators such as McKeachie (1994) and others offer suggestions for developing thinking skills, are teacher educators in agricultural education promoting a learning environment for preservice teachers that fosters higher-order thinking skills? These and other questions should be explored in developing the most cherished of all educational outcomes, higher-order thinking skills.

ERIC Full Text Provided by ERIC

REFERENCES

American Testronics (1990). Developing Cognitive Abilities Test: Comprehensive assessment program. Chicago: American Testronics.

Baumfield, V. (1997). Thinking skill: Identifying generic principle and supporting effective implementation. Paper presented at the 7th International Conference on Thinking [Online]. Available: http://www.nie.ac.sg:8000/~wwwnie/think/Papers/index.html [1998, December15].

Beggs, D. L., & Mouw, J. T. (1989). Assessing dimension of ability. In American Testronics, Developing Cognitive Abilities Test: Comprehensive assessment program. Chicago: American Testronics.

Blane, R. K. (1969). Relationship between measures of experimental, cognitive, and affective teaching behaviors and selected teacher characteristics. Unpublished doctoral dissertation, University of Florida, Gainesville.

Bloom, B. S., Englehart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (1956). Taxonomy of educational objectives-handbook 1: Cognitive domain. New York: David McKay Company, Inc.

Costa, A. L (1997). What human beings do when they behave intelligently and how they can become more so. Paper presented at the 7th International Conference on Thinking [Online]. Available: http://www.nie.ac.sg:8000/~wwwnie/think/Papers/index.html [1998, December15].

Dalzell, R. S. (1997). Hit or Myth: Teaching students to think. Do we?. Paper presented at the 7th International Conference on Thinking [Online]. Available: http://www.nie.ac.sg:8000/~wwwnie/think/Papers/index.html [1998, December15].

Davis, B. G. (1993). Tools for teaching. Jossey-Bass, San Francisco. de Bono, E. (1993). Teach your child how to think. New York: Viking.

Ennis, R. (1985). Goals for a critical thinking curriculum. In A. L. Costa (Ed.), Developing Minds: A Resource Book for Teaching Thinking. Alexandra, VA: Association for Supervision and Curriculum Development.

Gibbs, C. J. (1997). Teacher thinking, teaching thinking, and self-efficacy. Paper presented at the 7th International Conference On Thinking [Online]. Available: http://www.nie.ac.sg:8000/~wwwnie/think/Papers/index.html [1998, December15].

McKeachie, W. J. (1994). Teaching tips: Strategies, research, and theory for college and university teachers (9th edition). D.C. Heath and Company, Lexington.

McMillan, J. H. (1987). Enhancing college students' critical thinking: A review of studies. Research in Higher Education, 29, 3-29.

Miller, C. (1989). Cognitive levels of instruction and student performance in college of agriculture courses. Unpublished doctoral dissertation, The Ohio State University, Columbus.

National Commission on Excellence in Education. (1983). A nation at risk: The imperative for educational reform. David P. Gardner (Chair). Washington, D.C.: U.S. Department of Education.

Perkins, D. (1995). Smart schools: Better thinking and learning for every child. New York: Free Press.

Pickford, J. C. (1988). Selected student and professor variables related to cognitive achievement in college of agriculture course. Unpublished master's thesis, The Ohio State University, Columbus.

Secretary's Commission on Achieving Necessary Skills. (1991). What work requires of schools: A SCANS report for American 2000. Washington, D.C.: U.S. Department of Labor.

U. S. Department of Education. (1991) America 2000: Excellence in education. Washington, D.C.: Author.

Torres, R. M., & Cano, J. (1995). Increasing Thinking Skills through HOT Teaching. The Agricultural Education Magazine, 68(6), 8-9.

U. S. Department of Education. (1994). Goals 2000: Educate America Act. Washington, D.C.: Author.

U. S. Department of Education. (1997). Seven Priorities of the U.S. Department of Education. [Online]. Available: http://www.ed.gov/updates/7priorities/ [1998, November 2].

Whimbey, A. & Whimbey, L. S. (1976). Intelligence Can be Taught. New York: Bantam.

Wick, J. W. (1990). Developing cognitive abilities test. Technical Manual (Reproduction edition). Chicago: American Testronics.

Cognitive Abilities of Preservice Teachers: A Longitudinal Study in Agricultural Education

A Critique

Jacquelyn P. Deeds
Mississippi State University

The cognitive abilities of preservice agriculture education teachers have been a subject of interest to the profession for years. The article presented a good overview of the topic in general but did not provide a connection to previous research which related to the agricultural education discipline. To often it is the other way around, the general education research is ignored and agriculture education research is used exclusively. There is a need to find the appropriate median.

The researcher's purpose and objectives were clear and concise. They are to be commended for using a standardized instrument (DCAT) with a well-developed history of use and reliability estimates. The author provided a comprehensive description of the instrument and how it can be interpreted.

The researcher made good use of an intact group and was careful not to use statistics that would be inappropriate or to draw conclusions beyond the group studied. It is often difficult to get numbers large enough for significant studies by using intact classes. The author by using patience and longitudinal study was able to use smaller numbers of students from the teaching methods class to make up the larger population of the study.

The reader could benefit from more discussion of the scores the students received on the DCAT. Was a score of 18 good or bad? Because the DCAT is a standardized test, data should be available for comparison. How did these students score related the norm or to similar student populations?

The author indicates that teachers are the greatest influence of students' cognative ability and problem solving skills. What do these findings say about university agricultural education faculty and what can be done in practical terms to improve the students' skills?

The author provides food for thought about our students and our teaching and a unique way to do research using smaller classes.

ERIC

NAERC '99
Research Fresh from Florida

Desired And Assessed Cognitive Levels of Instruction: Are College of Agriculture Courses Taught on Campus and at a Distance Comparable?

Greg Miller
Iowa State University

Carol Pilcher
Iowa State University

INTRODUCTION

Do educators aspire to teach at higher cognitive levels and do they challenge their students to think? The role of the educator is not to transmit knowledge, but to challenge students to analyze, diagnose, and plan effective strategies (Knowles, 1970). In addition, the educator should encourage students to answer "why" questions. The process of asking and answering questions fosters critical thinking (Ennis as cited in Jones & Safrit, 1994).

Bloom, Engelhart, Furst, Hill, and Krathwohl's (1956) taxonomy of educational objectives can be used to define higher order thinking, or an interchangeable term – critical thinking (Jones et al., 1994). Bloom et al. identified the cognitive levels of learning as: knowledge, comprehension, application, analysis, synthesis, and evaluation. Their taxonomy is hierarchical. Mastery at each cognitive level is dependent on the student being able to successfully complete tasks associated with the subordinate levels (Gilbert, 1992). Higher order or critical thinking requires students to utilize the higher level cognitive skills such as application, analysis, synthesis, and evaluation (Miller, 1990).

ERIC

Newcomb and Trefz (1987) examined Bloom et al.'s taxonomy and condensed it into four cognitive levels. More specifically, Newcomb et al. classified knowledge as remembering; collapsed comprehension, application, and analysis into processing; classified synthesis as creating; and aligned evaluation with evaluating. Newcomb et al.'s model was developed for application to the college of agriculture teaching context. Their model provided the theoretical framework for this study.

Critical thinking is generally accepted as an important outcome of education by all academic disciplines (Presseisen, 1992; Resnick, 1987; Torres & Cano, 1995). In preparation for a more complex and technologically advanced society, agricultural faculty must challenge their students to attain the cognitive ability to solve problems, make decisions, and integrate new technology (Torres et al., 1995). According to Newcomb (1995, p. 4) "the agricultural education way of packaging learning somewhat automatically ensures students will have to think at the higher levels of cognition." Is the agricultural education way of packaging used in college of agriculture courses? If so, does that necessarily mean that professors are teaching at high cognitive levels?

Studies have shown that professors in agriculture do not teach at higher cognitive levels. Whittington and Newcomb (1993) reported that less than 1% of instructional time was spent at the evaluation level of cognitive discourse in courses taught by 10 College of Agriculture faculty at The Ohio State University. In addition, high cognitive levels were not reached in agriculture courses regardless of class size or course level in courses taught by 16 faculty members in the College of Agricultural Sciences at the Pennsylvania State University (Whittington, Stup, Bish, & Allen, 1997b). Furthermore, Whittington (1995) found that college of agriculture professors at the University of Idaho aspired to devote approximately 46% of their instructional time to the highest levels of cognition (creating and evaluating), but the professors actually reached these levels less than 3% of the time.

Researchers have evaluated the level of cognitive discourse in the on-campus classroom, but no research has been published about the level of cognition reached in agricultural distance education courses. According to Verduin and Clark (1991), faculty and administrators often view distance education as inferior. However, studies have shown that distance education methodologies are as effective as traditional methodologies in terms of cognitive outcomes (Verduin et al., 1991). Jones et al. (1994) claim that distance education can provide a unique opportunity to incorporate and foster critical thinking through interaction and collaborative inquiry. Do instructors capitalize on this unique opportunity in the distance education environment?

PURPOSE AND OBJECTIVES

The primary purpose of this study was to determine the cognitive level of instruction in agricultural courses taught at a distance. The objectives of the study were to:

1. Describe and compare professors' perceptions of appropriate cognitive levels of instruction for on-campus and off-campus versions of the same course.
2. Compare professors' perceptions of the appropriate cognitive level of instruction with the assessed level of instruction for their off-campus courses.
3. Compare assessed cognitive levels of instruction in off-campus agriculture courses to results of previous research pertaining to on-campus agriculture courses.
4. Compare cognitive levels of instruction in off-campus agriculture courses by delivery methods used.

PROCEDURES

The populations for the study consisted of all College of Agriculture distance education courses offered by Iowa State University and their instructors during the 1995 and 1996 calendar years. The populations consisted of 13 courses and 11 instructors from the departments of agricultural systems technology, agronomy, animal ecology, animal science, biochemistry and biophysics, entomology, horticulture, and sociology. The coordinator of the Off-Campus Professional Agriculture Degree Program provided the list of courses. The coordinator also confirmed the instructor of record and the method(s) of delivery used for each course. Each of the 13 courses was delivered in one of four ways. Three courses were delivered only through the Iowa Communications Network (ICN). The ICN is a two-way full motion video and audio delivery system linked through fiberoptics. Four courses were offered only by videotape. Five courses were offered by ICN and videotape. For these five courses, students in the ICN section(s) received instruction in real time while students in the videotape section(s) received videotapes of the ICN sessions. In one course, videotapes were made from traditional on-campus classes and distributed to off-campus students. Videotapes were routinely made of all ICN-delivered courses. Therefore, videotapes were available for all 13 College of Agriculture distance education courses.

Tools used to gather data for this study included a form with six demographic questions and a place for instructors to grant permission to analyze videotapes of their course(s), an appropriate cognitive level of instruction instrument, and the Florida Taxonomy of Cognitive Behavior (Webb, 1970). The appropriate cognitive level of instruction instrument was patterned after one developed by Whittington et al. (1993). It was designed to assess instructors' desired level of cognition for their courses. Instructors were asked to indicate the percentage of instructional time that they perceived to be appropriate to spend at each of Newcomb et al.'s (1987) levels (remembering, processing, creating, evaluating) of cognition for on-campus and off-campus versions of the same course. To assist them in understanding each cognitive level, instructors received a list of verbs associated with each level of cognition.

A memorandum was sent to each of the 11 instructors responsible for teaching the 13 off-campus courses explaining the purpose of the study and encouraging them to participate. The memorandum was followed by a phone call to schedule a face-to-face interview with each instructor. Interviews lasted approximately 30 minutes. During the interview, each instructor answered several demographic questions, completed an appropriate level of cognition instrument, and was asked to grant the researchers access to videotapes of their course. All instructors agreed to allow researchers access to course videotapes, and the response rate for demographic questions and the appropriate level of cognition instrument was 100%.

Videotapes from all 13 courses included in the population were analyzed. The videotapes were arranged chronologically, numbered, and divided into four equal periods of time. A stratified random sample of four videotapes was selected from each course for analysis. The sample was stratified by time period.

The Florida Taxonomy of Cognitive Behavior was used to determine the level of cognition in courses taught at a distance. Validity for this instrument was based upon its direct relationship to Bloom et al.'s (1956) Taxonomy. The instrument contained 55 action statements organized around Bloom et al.'s (1956) six levels of cognition. The data collector recorded whether or not each of the 55 actions occurred at six-minute intervals. Most of the videotapes were 120 minutes in length; thus, 20 intervals were analyzed for most tapes. To determine the percentage of instruction at each of Bloom's levels, the number of instructor actions observed at a given level was divided by the total number of actions observed. Finally, data were collapsed into Newcomb et al.'s (1987) categories.

Inter- and intrarater reliabilities on the Florida Taxonomy of Cognitive Behavior were assessed. Intrarater reliability was enhanced by studying Bloom et al.'s (1956) Taxonomy, practicing on two videotapes not included in the study, and by discussing analysis procedures with Dr. Susie Whittington, a researcher with considerable experience in using this instrument. Intrarater reliability was measured by re-analyzing 10 videotapes one month after the initial analysis and determining the percentage agreement between the first and second analysis. Intrarater reliability was .98. Interrater reliability was determined by measuring the level of agreement between the data collector and Dr. Susie Whittington in analyzing a tape used in this study. Interrater reliability was .82.

All data were analyzed with the SPSS for Windows personal computer program. Frequencies, percentages, means, and standard deviations were used for description. One-way analysis of variance and the Tukey honestly significant difference test were used to assist researchers in determining whether the assessed cognitive level of instruction in off-campus courses depended upon the delivery method used. The alpha level was established a priori at .05.

RESULTS

Of the 11 instructors, 10 (91%) were male. The instructors ranged in age from 39 to 64 years with a mean of 51.7 and a standard deviation of 6.7. A majority (63.6%) of instructors had a teaching appointment of 30% or less. The average teaching appointment was 38.4% with a standard deviation of 21.2. Instructors had, on average, taught for 23.5 years with a standard deviation of 7.5. Most (54.5%) instructors taught two courses per year. The average number of

courses taught per year was 2.21 with standard deviation of 1.38. In regards to distance teaching, instructors had taught, on average, 1.64 course sections with a standard deviation of .67 at a distance in the last three years.

Table 1 shows that instructors perceived that it would be appropriate to spend 33.1% of their instructional time at the remembering level, 30.0% at the processing level, 19.2% at the creating level, and 17.7% at the evaluating level of cognition in on-campus versions of their courses. Similarly, they perceived that it would be appropriate to spend 31.2% of their instructional time at the remembering level, 30.8% at the processing level, 20.0% at the creating level, and 18.1% at the evaluating level of cognition in off-campus versions of their courses. Table 1 also shows the assessed level of instruction for the off-campus courses. Instructors spent 45.1% of their instructional time at the remembering level, 51.6% at the processing level, 3.1% at the creating level, and .1% at the evaluating level of cognition.

Table 1. Comparison of means and standard deviations for appropriate and assessed levels of cognition

	Appropriate		Assessed
Level of Cognition	Mean[1] (SD)	Mean[2] (SD)	Mean[2] (SD)
Remembering	33.1 (23.3)	31.2 (24.3)	45.1 (7.24)
Processing	30.0 (11.2)	30.8 (12.7)	51.6 (5.95)
Creating	19.2 (12.2)	20.0 (15.6)	3.1 (3.33)
Evaluating	17.7 (12.7)	18.1 (12.5)	0.1 (.49)

Note. Values presented are percentages. [1] = On-campus, [2] = Off-campus.

Table 2 compares the assessed level of cognition from this study with the assessed level from three previous studies (Whittington et al., 1993; Whittington, 1995; Whittington et al., 1997b) of on-campus agriculture courses. Whittington et al. (1993) studied 10 faculty members at the Ohio State University, Whittington (1995) studied 14 faculty members at the University of Idaho, and Whittington et al. (1997b) studied 16 faculty members at the Pennsylvania State University. Data show that the assessed cognitive level of instruction in off-campus courses was practically equal to the levels found in on-campus courses.

Table 2. Comparing assessed level of cognition in on-campus vs. off-campus courses

Level of Cognition	Present Study %	1993[1] %	1995[2] %	1997[3] %
Remembering	45	42	43	47
Processing	52	53	55	51
Creating	3	5	1.5	1.5
Evaluating	<1	<1	<1	<1

Note. [1] = Whittington et al., (1993); [2] = Whittington (1995); [3] = Whittington et al., (1997b).

Table 3 compares the assessed cognitive level for off-campus courses by delivery method. Results show that courses taught through the ICN had significantly less instructional time spent at the remembering level than courses delivered by videotape or by both ICN and videotape. In addition, significantly more instructional time was spent at the creating level in courses delivered by ICN than in courses delivered by videotape, by both ICN and videotape, or by videotaped instruction using tapes made from traditional on-campus lectures. Significantly more instructional time was spent at the evaluating level in ICN-delivered courses than in courses delivered by videotape or both ICN and videotape.

Table 3. Comparing assessed cognitive level by delivery method

Level of Cognition	Mean[1] (SD)	Mean[2] (SD)	Mean[3] (SD)	Mean[4] (SD)	F
Remembering	39.4 a (3.5)	46.8 b (7.0)	47.3 b (8.1)	45.0 ab (4.1)	3.93*
Processing	53.5 a (5.1)	50.6 a (5.0)	51.0 a (7.3)	53.3 a (4.3)	.71
Creating	6.6 a (3.4)	2.6 b (3.2)	1.7 b (2.00)	1.8 b (2.2)	8.68*
Evaluating	.5 a (.9)	0.0 b (0.0)	0.1 b (0.2)	0.0 ab (0.0)	3.39*

Note. Values presented are percentages. [1] = ICN only, N = 12; [2] = Videotape only, N = 16; [3] = ICN and videotape, N = 20; [4] = Videotape and traditional on-campus, N = 4. * $p < .05$. Means with no matching letter differ significantly.

CONCLUSIONS AND RECOMMENDATIONS

Instructors desired to achieve practically identical cognitive level outcomes in on- and off-campus versions of their courses. Results of this study and previous studies of on-campus courses show that instructors fell far short of their aspirations. They overreached their aspirations related to lower level (remembering and processing) cognitive outcomes and underreached their aspirations related to higher level (creating and evaluating) cognitive outcomes. It was concluded that instructors teach to the same levels of cognition in on- and off-campus courses. This finding provides evidence to contradict faculty perceptions (Miller & Shih, 1998) that off-campus courses result in lower level cognitive outcomes than on-campus courses. While this may be viewed as positive by proponents of off-campus agriculture courses, the fact remains that the assessed levels of cognition were low in relation to what instructors perceived to be appropriate. Results of this study were shared with the participating instructors along with suggestions on how they might adapt their teaching to reach the levels of cognition to which they aspired. It was believed that positive change might result from individual faculty consultation. Whittington, Bowman, and Tirima (1997a) demonstrated that faculty development interventions can lead to a positive shift in the cognitive level of discourse of professors.

Results of this study show a relationship between the cognitive level of instruction and the delivery method. The cognitive level of instruction in off-campus courses delivered by ICN was assessed to be higher than the other three delivery methods studied. ICN is more like the traditional classroom than the other delivery methods. ICN-delivered courses allow for more real-

ERIC Full Text Provided by ERIC

time interaction between instructors and students, and this interaction may be a plausible explanation as to why instruction in ICN-delivered courses was assessed at higher cognitive levels. Why would interaction make a difference in ICN-delivered courses but not in the traditional on-campus setting? Off-campus learners are typically older and have more relevant real-world experience than the traditional undergraduate on-campus student. When given the opportunity to synchronously interact with the instructor, they may stimulate higher cognitive level discourse. Further research is needed to confirm or disconfirm this hypothesis. In the mean time, it is recommended that instructors preparing to deliver courses off-campus consider the cognitive levels of the outcomes they desire for students. If a significant proportion of the outcomes is at higher cognitive levels, instructors should consider using ICN as the distance delivery method.

ERIC Full Text Provided by ERIC

REFERENCES

Bloom, B.S., Engelhart, M.D., Furst, E.J., Hill, W.H., & Krathwohl, D.R. (1956). Taxonomy of educational objectives book 1: Cognitive domain. New York: David McKay Company, Inc.

Gilbert, S.W. (1992). Systematic questioning: Taxonomies that develop critical thinking skills. Science Teacher. 59(9): 41-46.

Jones, J.M., & Safrit, R.D. (1994). Developing critical thinking in adult learners through innovative distance learning. Paper presented at the International Conference on the Practice of Adult Education and Social Development, Jinan, China.

Knowles, M.S. (1970). The modern practice of adult education: Andragogy versus pedagogy. Chicago: Follett Publishing Company.

Miller, C. (1990). Higher-order thinking: An integrated approach for your classroom. Vocational Education Journal. 65(6): 26-27, 69.

Miller, G., & Shih, C. C. (1998). College of agriculture teaching faculty perceptions of academic rigor in on- and off-campus courses. Proceedings of the Central Region 52nd Annual Research Conference in Agricultural education St. Louis, MO.

Newcomb, L.H. (1995). The genius of the agricultural education model for nurturing higher order thinking. The Agricultural Education Magazine, 68(6), 4,6.

Newcomb, L.H., & Trefz, M.K. (1987). Levels of cognition of student tests and assignments in the College of Agriculture at The Ohio State University. Proceedings of the Central Region 41st Annual Research Conference in Agricultural Education, Chicago, IL.

Presseisen, B.Z. (1992). Thinking skills in the curriculum. In J. W. Keefe & H. J. Walberg (Eds.), Teaching for Thinking (pp. 1-14). Reston, VA: National Association of Secondary School Principals.

Resnick, L.B. (1987). Education and learning to think. Washington, DC: National Academy Press.

Torres, R.M., & Cano, J. (1995). Examining cognition levels of students enrolled in a college of agriculture. Journal of Agricultural Education, 36(1), 46-54.

Verduin, J.R. Jr., & Clark, T.A. (1991). Distance education. San Francisco: Jossey-Bass Publishers.

Webb, J.N. (1970). The Florida taxonomy of cognitive behavior. In A. Simon and E. G. Boyer (Eds.), Mirrors for behavior II: An anthology of classroom observation instruments, Philadelphia: Classroom Interaction Newsletter.

Whittington, M.S. (1995). Higher order thinking opportunities provided by professors in college of agriculture classrooms. Journal of Agricultural Education, 36(4), 32-38.

Whittington, M.S., Bowman, G.L.T., & Tirima, H.G. (1997a). Changing the opportunities provided for cognitive processing in college of agriculture classrooms. Proceedings of the 24th National Agricultural Education Research Meeting, Las Vegas, NV.

Whittington, M.S., & Newcomb, L. H. (1993). Aspired cognitive level of instruction, assessed cognitive level of instruction, and attitude toward teaching at higher cognitive levels. Journal of Agricultural Education, 34(2), 55-62.

Whittington, M.S., Stup, R.E., Bish, L., & Allen, E. (1997b). Assessment of cognitive discourse: A study of thinking opportunities provided by professors. Journal of Agricultural Education, 38(1), 46-53

DESIRED AND ASSESSED COGNITIVE LEVELS OF INSTRUCTION: ARE COLLEGE OF AGRICULTURE COURSES TAUGHT ON CAMPUS AND AT A DISTANCE COMPARABLE?

A Critique

James J. Connors, PhD
University of Idaho

The 1990s has seen the proliferation of courses taught through distance education at land-grant universities across the country. As the number of distance education courses has increased there has been an ever-growing need to investigate the quality of instruction offered to students who are enrolled in courses offered off-campus.

This study investigated the cognitive levels of instruction for on- and off-campus courses taught by the College of Agriculture at Iowa State University. As is found in most states, distance education courses are offered in a number of different formats. The researcher is to be complimented for designing a study which incorporated all four methods of delivery used in the distance education program.

The researcher utilized the Florida Taxonomy of Cognitive Behavior as the instrument to analyze the cognitive levels of instruction in the distance education courses. The researcher went to great lengths to establish intra-rater and inter-rater reliability of the instrument. The results of this study can be accepted without hesitation because of the effort in determining the reliability of the instrument prior to the study.

The study found that the assessed level of cognition in the off-campus courses was very different from the instructors' perceived appropriate level. The instructors' had the opportunity to identify their idea of an appropriate level of cognitive instruction in on- and off-campus courses. I would ask the question, what is the appropriate level of instruction in higher-order skills? Is there an appropriate amount of instruction that should be directed toward the creating and evaluating levels of instruction?

A result that can be of significant benefit is the fact that the assessed level of instruction in off-campus courses was found to be similar to other studies of on-campus courses. This gives evidence to the fact that there is no difference in the quality of instruction between on- and off-campus courses. However, there was significant differences in levels of instruction between the type of distance methods utilized. This gives rise to the question, is there a hierarchy of distance education methods? Is two-way full motion video or compressed-video the best form of distance education because it elicits higher, albeit very low, levels of instruction in creating and evaluating than other forms of distance education?

The use of distance education courses in land-grant universities is expanding far faster than faculty development in distance education. At my university, significant resources are being put toward improving the technological skills (e.g. computers, PowerPoint, web pages, etc.) of instructors who teach distance education courses. However, little effort is being put into improving the faculty's cognitive level of their instruction.

This study offered significant evidence that there is no difference between the quality of on-campus and off-campus courses offered through distance education methods. However, it did, once again, remind faculty of the low-level of cognitive instruction in both on- and off-campus courses. Significant effort should be put forth to continually improve instruction at all levels.

NAERC '99
Fresh Florida

Preferences and Experiences of Distance Learners Participating in Agricultural Distance Education Courses

Timika Gray
Iowa State University

W. Wade Miller
Iowa State University

INTRODUCTION

Distance education is increasing the educational opportunities for many adult learners. It is the fastest growing instructional trend in the world. The accessibility of education, through the use of communication technologies and instructional systems, is making distance education a growing alternative to traditional classroom instruction for adult learners (Main and Riise, 1995; Miller and Miller, 1998).

Today, distance education opportunities are offered through a wide variety of media (Simonson, Scholosser and Anderson, 1993). Opportunities such as videotape, Internet, satellite, and the fiber-optic interactive viewing systems are available. These media allow agricultural educators to provide educational opportunities, both live and delayed through the use of video storage mechanisms, to adults who would not have access to education due to work, family, and social commitments (Miller and Pilcher, 1998; Schoenfelder, 1995; Swan, 1998).

Distance education is becoming a part of everyday existence and may be viewed as the norm (Dede, 1995). However, questions of interaction needs of distance learners are of great

ERIC

concern (Acker and McCain, 1993, p. 11). Nevertheless, some researchers have found that distance learners perform better than traditional learners, and their success is attributed to their increased commitment, maturity, and motivation (Jackson, Raven, 1996).

Research by Kearsly (1995) stated that consideration should be given to the fact that perceptions of interactivity may be as important as actual interaction. Fulford and Zhang (1995) found that a predictor of student satisfaction in a course was not necessarily personal interaction, but the perception of overall interaction. When conducting research about the interaction needs of distance learners, it is imperative that researchers understand what distance learners perceive as interaction.

Daily distance learning opportunities are increasingly being transformed into a new educational paradigm of distributed learning (Dede, 1995). This new paradigm has many implications for agricultural education. Implications range from interaction preferences to how interaction influences learner academic performance. This study will focus on distance learners' preferences and experiences regarding delivery methods and perceived interaction needs.

Distance education is an area of research that is being examined by the educational community (Willis, 1994). A major concern for distance educators is the characteristics and educational needs of students who are taking distance education courses. Most agricultural educators believe extra work is necessary to effectively plan and deliver distance courses (Jackson and Bowen, 1995). Hence, there is a need to discover the interaction needs of distance learners. Discovering the interaction needs of distance learners will allow agricultural educators to provide a learning atmosphere that is meaningful to the students.

Interaction has been described as important to the instructional process relating to distance education today (Jackson, 1994; Main and Riise, 1995). Fulford and Zhang (1995) indicated that interaction is linked to satisfaction, motivation, quality, and perceived learning. Thus, the quality and type of interaction provided in distance education courses concerns educators because learner satisfaction and perceived learning are affected by interaction (Scholdt, Zhang, and Fulford, 1995).

Studies indicate that the more interaction that is present in a distance education setting the more positive the students' attitudes will be toward the experience (Jurasek, 1993). Because some previous research has indicated that learner-instructor interaction is not an important factor to students in a distance education setting, the question is: what do students perceive as interaction (Fulford and Zhang, 1995). What can agricultural educators do to better meet distance learners' interaction needs?

ERIC

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the preferences, performance, and perceived interaction needs of graduate students in agricultural courses taught via distance education at Iowa State University. The objectives were as follows:

1. Describe selected demographic characteristics of students enrolled in courses offered through the distance education program.
2. Determine distance learning delivery method preferred by distance learners.
3. Compare student performance to mode of taking a course.
4. Identify interaction needs of distance learners.

METHODS AND PROCEDURES

The study used was descriptive in nature and focused on the perceptions held by the graduate students who participated in the distance education program during the Spring 1998 semester. The list of names and addresses were supplied by the Extended and Continuing Education Office (ECE) at Iowa State University.

The total population size was 113. Because the population size was relatively small, the study focused on the total population and a sample was not drawn.

The questionnaire consisted of interaction statements and a demographic section. Content and face validity were established by a panel of experts in agricultural education. The questionnaire yielded a Cronbach's Alpha of .95 for reliability. The questionnaire along with a cover letter and stamped return envelope were mailed to each student.

The students' perceptions of interaction in distance education were measured according to Moore's categories of interaction. Interaction was measured based on learner-content interaction, learner-instructor interaction, and learner-learner interaction (Moore, 1989). Learner-interface interaction, which is the interaction that occurs when a learner must use intervening technologies to communicate, also was evaluated (Hillman, Willis, and Gunawardena, 1994). Fulford and Zhang (1995) developed an instrument that measured students' perception of interaction (SPI) in a distance education classroom. This scale yielded a reliability score of .85 and was a subscale for this study.

Interaction statements were measured using a Likert-type scale that ranged from "extremely negative" (1) to "extremely positive" (8) and included a (9) response category for "does not apply." Interaction statements were developed from a review of relevant literature and instruments used for similar purposes in other studies. Each statement asked students to read the statement and circle the number that represented their opinions as to whether the situation described would be a positive or negative learning experience.

The questionnaire along with a cover letter explaining the purpose and objectives of the study were mailed to the students after the end of the semester. A self-addressed stamped envelope was included in the mailing. Participants were asked to return the blank questionnaire if they did not want to participate in the study.

The first mailing yielded 36 returns within 19 mailing days. A letter was then sent as a reminder to all of the nonrespondents asking them to return the questionnaire. Twenty-two additional questionnaires were returned. A third mailing was sent out 3 weeks later to all nonrespondents. A total of 79 surveys were received. Twelve students returned the blank questionnaire, indicating that they did not want to participate in the study. Sixty-seven surveys were completed and usable, for a response rate of 59.3%. This response rate was similar to other studies of this population conducted in 5 years preceding this study.

RESULTS

Objective 1: Describe selected demographic characteristics of students enrolled in courses offered through the distance education program. Table 1 shows the occupation of graduate students who were enrolled in the courses.

Table 1. Occupation of graduate students in distance education courses.

Occupation	Frequency	Percentage
Farming	16	24.2
Agribusiness	27	40.9
Agricultural Extension/Education	7	10.6
Other	16	24.3
Total	66	100.0

Note: Occupation "Other" consisted of chemist, student, maintenance, government, homemaker, lab director, pharmaceutical employee, finance.

Out of the 67 participants, 27 were employed in agribusiness and 16 were farmers. Twenty-three of the participants listed "other" as their occupation. Most of them were employed with the state or national government in some capacity or in nonagricultural positions.

There were 49 males and 17 females in this study. The age of the participants in this study ranged from 19 to 60. More than 75% of the participants were between the ages of 30 and 60. Approximately 70% of the participants were married, and 20% were single. The other 10% were either widowed or divorced.

Table 2 illustrates participants' reasons for taking distance education courses. The participants were taking courses to earn a degree, to improve career performance, or for personal interest. Over 60% of the participants were pursuing a degree. Videotape and (Iowa Communications Network) ICN courses made it easier for participants to keep their jobs and remain home with their families while meeting educational endeavors. Because of the participants' employment and family commitments, more than 85% of the student population in the distance education program were part-time students. The small number of participants who were full-time students were usually between the ages of 19 and 29.

Table 2. Participants' reasons for taking distance education courses.

Reason	Frequency	Percentage
Pursing a degree	42	63.6
Improve Performance in business/career	18	27.3
Personal interest/hobby	5	9.1
Total	63	100.00

Objective 2: Determine distance delivery method preferred by distance learners.

A total of 28 participants took courses using the ICN and 30 participants took courses using videotape. Approximately 93% of the participants said that they would do it again. As shown in Table 3, more than 75% of the participants were satisfied to very satisfied with the distance education courses that they had taken. This may be attributed to the fact that videotape and ICN courses allow students to have access to education at times that are convenient for them. Therefore, the participants in this study were satisfied because education was available to them.

Table 3. Satisfaction level of graduate students who enrolled in distance education courses offered through the distance education program.

Satisfaction Level	Videotape Frequency	Videotape Percentage	ICN Frequency	ICN Percentage
Very dissatisfied	1	3.4	2	7.4
Dissatisfied	2	6.9	0	0.0
Somewhat dissatisfied	1	3.4	2	7.4
Somewhat satisfied	1	3.4	1	3.7
Satisfied	11	37.9	15	55.6
Very satisfied	14	44.8	8	25.9
Total	30	100.00	28	100.0

Objective 3: Compare student performance to mode of taking a course.

Table 4 provides the grades of the participants in this study. Almost 60% of the videotape students received an "A" in their courses, and 46% of the ICN students received an "A" in their courses. Less than 10% of both the videotape and ICN students received a letter grade below average in distance education courses. Approximately 12% of the ICN students received an incomplete or took a course that was not graded. Courses that were not graded were either pass/fail or workshops offered during the Spring 1997 semester. Students who took courses by videotape earned letter grades of A or B more frequently than students who took courses via the ICN (86.5% vs. 65.5%).

ERIC Full Text Provided by ERIC

Table 4: Grades of graduate students in the distance education program.

Grade	Videotape Frequency	Videotape Percentage	ICN Frequency	ICN Percentage
A	13	59.1	12	46.3
B	6	27.4	5	46.2
C	1	4.5	5	19.2
D	1	4.5	0	0.0
F	1	4.5	1	3.8
Incomplete or Nongraded	1	4.5	3	12.5
Total	23	100.0	26	100.00

Objective 4: Identify interaction needs of distance learners.

The interaction needs of students were measured by means and standard deviations of the items on the questionnaire. Students were to respond if questions were either positive or negative to their learning experiences in a distance education setting.

Table 5 illustrates the questions that participants believed were slightly to moderately negative to their learning experiences. The moderately positive to very positive statements are illustrated in Table 6. Subject matter content of classes seems to be more important to the students.

Table 5: Statements that were rated slightly to moderately negative to learning experiences.

Statement	Mean
Students seldom ask each other question.	4.62
There is little interaction between students.	4.30
The instructor seldom answers the students' questions.	4.15
Having to wait during class for the instructor.	3.64
The instructor seldom answers the students' questions.	3.81
In class, students seldom state their opinions to each other.	4.32
Students seldom answer each other's questions.	4.12
Students seldom answer questions that the instructors ask.	4.44
Interaction is low in class.	3.81
Being the only student at a remote-site.	4.59
Other students' fears of distance education technology.	4.77
Poor instructor use of distance education technology.	4.05
Being physically separated from the teacher.	4.68

Note: 1=extremely negative; 2=very negative; 3=moderately negative; 4=slightly negative; 5=slightly positive; 6=moderately positive; 7=very positive; 8=extremely positive.

The questionnaire was divided into subscales to identify specific interaction needs of students. Interaction was measured by the categories identified by Moore (1989) and Hillman et

al. (1994): learner-learner, learner-instructor, learner-content, learner-interface (Fulford, Sherry and Zhang's (1997). Each subscale had a Cronbach Alpha above .65. Table 7 shows the means and standard deviations of the interaction subscales by mode. The differences between means of videotape and ICN students when measured against subscales were small. In consistency with the entire study, learner-content interaction had the highest means.

Table 6: Statements that were rated moderately positive to very positive in participants' learning experience.

Statement	Mean
Privately discussing course work with instructor.	6.44
Privately discussing course work with other students.	6.49
Using computers during class activities.	6.41
Instructor provides students guidance regarding class assignments.	6.39
Program support staff.	6.53
Program Advisor.	6.70
Receiving course materials on time.	6.44
Using computers outside of class for assignments.	6.49
Instructor asks me a question related to class content.	6.41
Instructor evaluation of my class work.	6.40
Personal evaluation of my class work.	6.40
Use of guest speakers in class.	6.67
In-class group activities.	6.31

Note: 1=extremely negative; 2=very negative; 3=moderately negative; 4=slightly negative; 5=slightly positive; 6=moderately positive; 7=very positive; 8=extremely positive

Table 7: Mean and standard deviation comparison of interaction subscales by mode of delivery.

		Videotape			ICN		
Interaction	N	N	M	SD	N	M	SD
Learner-Learner	10	24	5.45	1.33	28	5.45	1.00
Learner-Instructor	15	28	5.90	.98	28	5.77	1.03
Learner-Content	13	27	6.03	.98	29	5.99	.91
Learner-Interface	14	25	5.55	1.09	28	5.58	1.02
SPI	13	26	7.37		28	1.05	

Note: 1=extremely negative; 2=very negative; 3=moderately negative; 4=slightly negative; 5=slightly positive; 6=moderately positive; 7=very positive; 8=extremely positive

ERIC Full Text Provided by ERIC

As can be seen in Table 8 the correlation among the subscales and age ranged from very high to low association. Because technology is very significant to distance education there was a very high correlation between learner-interface subscale and the age of the learner-content.

The participants in this study's general concern consistently seemed to be content. The participants were very interested in obtaining the information that they needed either to obtain a degree or fulfill professional development requirements that are necessary to advance to the next employment level.

Table 8: Interaction subscales relationship to the age of graduate students enrolled in distance education courses.

Interaction	N	Correlation Coefficient	Adjective
Learner-Learner	59	.20	Low
Learner-Instructor	64	.14	Low
Learner-Content	63	.64	Substantial
Learner-Interface	64	.75	Very High
Fulford	62	.30	Moderate

Note: .01-.09=negligible; .10-.29=low; .30-.49=moderate; .50-.69=substantial; .70-.99=very high; 1.00=perfect (Davis, 1971.

CONCLUSIONS AND RECOMMENDATIONS

Most graduate students were satisfied with the courses they took, whether they were taken via videotape or the ICN. They indicated that they would be willing to take another course again the same way, and they rated each mode highly.

Students taking courses via videotape or the ICN tended to receive similar grades for the courses. It appeared that the method of taking a course did not affect the grades they earned.

The interaction statements rated as the most negative to the students' learning experiences were mainly related to human interaction between students and the instructor taking place during a class session. It appeared that students felt that lack of human interaction was slightly to moderately negative to their learning experience. These statements were most relevant in the ICN setting, because live, human interaction does not exist in the videotape setting unless students view the videotape in groups.

The interaction statements rated as the most positive to the students' learning experiences were mostly statements about interaction between student and instructor, program administration and support, and the use of computers in completing assignments. It appears that students valued human interaction between and among themselves and the instructor. They also valued the student services they received and the use of the computer in completing assignments.

When interaction items on the questionnaire were grouped by type of interaction, the Learner-Content scale emerged as the most important form of interaction (moderately positive)

followed closely by Learner-Instructor scale (slightly positive). The scales were rated similarly regardless of whether a student took the course by videotape or in an ICN classroom. Graduate students valued their interaction with the content of the courses first and then their interaction with the instructor. Learner-Instructor interaction was easier in the ICN situation and was more difficult in the videotape class. The instructor in a videotape class could provide interaction via a Listserv, a Web conferencing board on the Internet, encouraged or required telephone calls, and periodic on-campus meetings.

Age appeared to be a factor when students rated some of the subscales of interaction. Age was substantially correlated to the Learner-Content scale and very highly correlated to the Learner-Interface scale. The correlation between age and the overall measure of interaction known as the SPI scale was moderate. It appeared that older students placed a higher value on Learner-Content interaction and Learner-Interface interaction than did younger students. It is possible that content is more important to older students because they are looking for content in the classes that will help them in their daily jobs or life. The Learner-Interface interaction scale consists of items related to instructional technology. It is possible that the older students see the value of instructional technology to be more important or they were strongly impressed by the technology.

The results from this study indicate that Iowa State University should continue to offer courses by both videotape and the ICN. It appears that both types of courses serve the needs of students. Videotape courses appeal to students who cannot take a course at a scheduled time due to work or other time conflicts. ICN courses appeal to students who can attend class meetings at a scheduled time but cannot travel to the campus for a course due to time and distance factors.

Efforts should be made to improve the quality of videotape courses and ICN courses in the area of interaction. Videotape courses do not provide the opportunity for face-to-face interaction during a class session, but many other opportunities for interaction exist. Interaction can take place through the use of mail, telephone, e-mail, fax, and the Internet. Face-to-face interaction is possible in an ICN-delivered course. However, the instructor must plan for this type of interaction by providing time for discussion and group activities. Without interaction, an ICN-delivered course is not much different from a videotape course in terms of student experience.

Instructors should take into account the strong need on the part of students to interact with the subject matter in the course. The primary reason many students take a course is their perceived need for the subject matter being offered. With this in mind, course materials, textbooks, and supplementary reading materials should be made readily available to the students to provide them the opportunity to more fully interact with the subject matter.

REFERENCES

Acker, S. R. and T. A. McCain. (1993). The contribution of interactivity and two-way video to successful distance learning applications: A literature review and strategic positioning. The Center for Advanced Study in Telecommunications. The Ohio State University: Columbus, OH.

Bowen, B. and G. B. Jackson. (1992). Enhancing Diversity in Vocational Education. (ERIC Document Reproductive Service No. ED 354 387).

Davis, J.A. (1971). Elementary Survey Analysis, Prentice-Hall. Englewood Cliffs, N.J.

Dede, C. (1995). The Transformation of Distance Education to Distributed Learning. Graduate School of Education, George Mason University: Fairfax, VA.

Fulford, C. P. and S. Zhang. (1995). Interactivity in Distance Education Television: A Constructed Reality. Department of Educational Technology, University of Hawaii: Honolulu, HI.

Hillman, D. C., D. J. Willis, and C. N. Gunawardena. (1994). Learner-interface interaction in distance education: An extension of contemporary models and strategies for practitioners. The American Journal of Distance Education 8 (2): 31-42.

Jackson, G. B. (1994). A conceptual model for planning agricultural distance education courses and programs. Proceedings of the 21st Annual National Agriculture Education Research Meeting, Dallas, TX

Jackson, G. B. and M. R. Raven. (1996). A Comparison of Cognitive Performances of Distance and Resident Classroom Agricultural Education Graduate Students. Proceedings of the 23rd Annual National Agricultural Education Research Meeting, Cincinnati, OH.

Jurasek, K. A. (1993). Distance education via compressed video: An evaluation of the attitudes and perceptions of students and instructors. Iowa State University: Ames, IA.

Kearsly, G. (1995). The nature and value of interaction in distance learning. Proceedings of the Invitational Research Conference in Distance Education: Towards Excellence in Distance Education: A Research Agenda. The American Center for the Study of Distance Education, Pennsylvania State University, College Station, PA.

Main, R. G. and E. Riise. (1995). A study of interaction in distance learning. California State University: Chico College of Communication. (ERIC Document Reproduction Service No ED 383282).

Miller, G. S. and W. W. Miller. (1998). If You Build It, Will They Come? A Statewide Two-way Interactive Network for Distance Education. Proceedings of the 25th Annual National Agricultural Education Research Meeting, New Orleans, LA. 141-150.

Miller, G. S. and C. Pilcher. (1998). Off-Campus Students and Agriculture Teaching Faculty Perceptions of Academic Rigor In On- and Off-Campus Courses. Proceedings of the 25th Annual National Agricultural Education Research Meeting, New Orleans, LA. 163-170.

Moore, M. G. (1989). Three types of interaction. The American Journal of Distance Education 3 (2): 1-6.

Schoenfelder, K. R. (1995). Student involvement in the distance education classroom: Teacher and student perceptions of effective instructional methods. Encyclopedia of Distance Education Research in Iowa. Research Institute for Studies in Education, College of Education, Iowa State University: Ames, IA.

Scholdt, G. P., S. Zhang and C. P. Fulford. (1995). Sharing Across Disciplines-Interaction Strategies in Distance Education Part I: Asking and Answering Questions. University of Hawaii: Honolulu, HI. (ERIC Document Reproduction Service No ED 383377).

Simonson, M.R., C. Schlosser, and M. Anderson. (1993). Encyclopedia of Distance Education Research in Iowa. The Teacher Education Alliance of the Iowa Distance Education Alliance, Iowa State University: Ames, IA.

Swan, M.K. (1998). Distance Education: Agriculture Student Achievement. Proceedings of the 25th Annual National Agricultural Education Research Meeting. New Orleans, LA. 152-161.

Willis, B. (1994). Distance Education Strategies and Tools. Educational Technology Publications: Englewood Cliffs, NJ.

ERIC

PREFERENCES AND EXPERIENCES OF DISTANCE LEARNERS PARTICIPATING IN AGRICULTURAL DISTANCE EDUCATION COURSES

A Critique

James J. Connors, PhD
University of Idaho

As more and more distance education courses are offered using different methods of delivery, it is important to investigate students' preferred delivery methods, their performance and their opinions of interaction in the class. This study compared distance courses offered through video tape and over the Iowa Communications Network.

The population of the study was heavily slanted towards off-campus agricultural related professionals. It would have been interesting to see if the results of the study would have been different if the population was not as closely related to agriculture or included students who were less motivated to do good in the course. As is evident in most states, including mine, students who participate in distance education courses have clear educational goals and are highly motivated to do a good job.

It is reassuring to see that approximately 93% of the participants in both the video and ICN courses would take the course again. I did find it interesting that the video tape course had a higher percentage of students who were "very satisfied" compared to the ICN course. A similar phenomenon can be seen when looking at students' grades in the classes. While overall numbers are similar, a greater percentage of students in the videotape course received grades of "A" than in the ICN course. Could this have been because students viewing videotapes can review the material as often as needed and progress as slowly or quickly as they desire? Would the grades have been higher in the ICN course if students could check out videos of the live course in order to review the material as needed?

The study found that the learning experiences that were slightly to moderately negative for students was student-student interaction and student-teacher interaction. Could this have been due to the technology or the quality of the instruction? Instructors in the ICN courses may not have properly asked questions, provided enough wait-time, or challenged students responses to elicit more thorough understanding of the concepts. As an instructor who has taught in my College's distance education studio I have found it even harder to ask a question and provide enough wait time for the students' answer than in a live classroom environment. Perhaps it is the idea that there is quiet "dead air" time being used waiting for responses from students at remote sites. It would have been interesting to know if any of the instructors in the ICN courses ever traveled to the remote site(s) to meet the students, interact with them one-on-one, and teach to them "live" at least once during the course.

The learning experiences that seemed to be most positive for the students were course management activities. Students liked their program advisor, the support staff, receiving the course material on time and the instructor's evaluation of their course work. The few items that were related to instructional methods seemed to related to the use of computers and technology during the course.

ERIC

The study found that learner-content and learner-instructor relationships had the highest ratings by students. The researchers acknowledged that learner-instructor interaction could be improved by providing Listservs, web conferencing or on-campus meetings. Would this interaction be improved if all video tape courses had accompanying web pages and on-line discussion groups?

ERIC Full Text Provided by ERIC

The Quality of On- and Off-Campus Courses: A Comparison of the Perceptions Held by Off-Campus Students and Agriculture Teaching Faculty

Greg Miller
Iowa State University

Carol Pilcher
Iowa State University

INTRODUCTION

Increasing competition, costs, and accountability are driving forces behind an intensifying emphasis on quality in education (Seymour, 1993). This focus on quality is also intensifying in the distance education realm. In fact, Olcott (1991) emphasized that the quality of off-campus courses is a universal concern among the stakeholders in education. Although quality in education has been identified as a primary concern, it has not been well defined. The traditional indicators of quality that academic institutions identify include: entrance standards, famous graduates, reputation rankings, and/or the presence of distinguished faculty (Seymour, 1993; Verduin & Thomas, 1991). However, these indicators measure the quality of academic institutions, not the quality of the educational experience at the course level.

Quality of education is a relative abstraction that reflects individual values, perceptions, and experiences between the student and the professor (Schwartz & Peterson, 1993; Seymour, 1993). Recognizing its relative nature, Garvin (1984) provided a measurable framework for defining quality. He identified five indicators of quality including: manufacturing-based, user-based, value-based, transcendent, and product-based. Manufacturing-based definitions emphasize

the supply side and are mainly concerned with "conforming to requirements" (p. 28). These requirements are often the result of consumer preferences. User-based definitions focus on consumer preferences. In the user-based approach, products that satisfy consumer requirements are of highest quality. The value-based approach describes quality as performance at an acceptable cost. Transcendent quality is "innate excellence" (p. 25). In the transcendent approach, quality is difficult to define because it is recognized only through experience. Product-based definitions identify quality as an inherent and measurable attribute.

Garvin's (1984) framework has been applied to studies (Gilbert, Keck, & Simpson, 1993; Schwartz & Peterson,1993; Seymour ,1993) of quality in education. More recently, Miller and Shih (1998) used Garvin's framework to describe faculty members' perceptions of the quality of on- and off-campus agriculture courses. Miller et al. focused on faculty perceptions because Dillon and Walsh (1992) cited faculty resistance as a major obstacle to the success of distance education programs. Results of their study indicate that faculty perceived off-campus courses to be of lower quality than on-campus courses. Although Miller et al. examined faculty perceptions, it is important to also consider the perceptions of students. According to Schwartz and Peterson (1993), a focus on quality from the students' perspective is imperative for understanding the educational process.

Total quality management (TQM) in education advocates a focus on students' perspectives. In TQM, the customers' needs are paramount; the customers are the students. In fact, Sallis (1993) claims "the customers are the final arbitrators of quality and without them the institution does not exist" (p. 24). According to this TQM perspective, quality occurs when the students' needs are addressed. Students' needs are becoming the focus of quality as TQM increasingly is being implemented in education (Sallis, 1993). Who should determine quality? If quality reflects the individual values, perceptions, and experiences between the student and professor, then understanding the perceptions of both faculty members and students may provide insight into the quality of specific educational experiences.

PURPOSE AND OBJECTIVES

The purpose of this study was to describe and compare perceptions of the quality of on-campus and off-campus courses held by off-campus students and college of agriculture teaching faculty. The objectives of the study were as follows:

1. Compare off-campus agriculture students' perceptions of the quality of on- and off-campus courses.
2. Compare and contrast off-campus agriculture students' perceptions of the quality of on- and off-campus courses with those of college of agriculture teaching faculty members.
3. Compare and contrast off-campus agriculture students' perceptions of selected off-campus student and course characteristics with those of college of agriculture teaching faculty.

PROCEDURES

The populations for this study included students enrolled in courses offered through the Iowa State University College of Agriculture Off-Campus Professional Agriculture Degree Program during spring and fall semesters of 1997 and faculty members with teaching responsibilities or with teaching experience in the same college of agriculture during spring semester 1997. The coordinator of the Off-Campus Professional Agriculture Degree Program provided the list of students. Individual class lists were used to confirm that each student had truly taken their course(s) off-campus. The Dean's office provided the list of teaching faculty members, and departmental secretaries checked the list for accuracy. The target populations were composed of 173 students and 262 faculty members. A census of both populations was conducted.

One might reasonably question whether these students and faculty had an appropriate frame of reference for assessing the quality of both on- and off- campus courses. In other words, had the off-campus students ever taken an on-campus course and were faculty perceptions influenced by whether they had any experience teaching off-campus? It was assumed that all off-campus students had taken on-campus college level courses. Considering requirements for entry into the Off-Campus Professional Agriculture Degree Program, it would be very unlikely that any of the off-campus students surveyed would not have completed an on-campus college-level course. To do so, students would have completed all freshman and sophomore level general education requirements through distance education. Doing so is not currently possible at this university. With regard to faculty perceptions, point biserial correlation analyses revealed that faculty perceptions of the quality of on- and off-campus courses had only negligible (Davis, 1971) associations with participation in faculty development programs related to distance education and experience with distance teaching.

The questionnaire, designed by Miller et al. (1998), included two Likert-type scales, 11 closed-ended questions, and 1 open-ended question. Four of Garvin's (1984) approaches (manufacturing-based, user-based, value-based, and transcendent) to defining quality provided the framework for developing the course quality statements included on the Likert-type scales. The scales had response options ranging from (1) strongly disagree to (5) strongly agree. One of Garvin's approaches was not believed to be applicable to this study. Product-based definitions of quality rely on the ability to objectively and precisely measure the extent to which a product possesses certain desirable characteristics. This approach assumes that a quality ranking of products is possible based on the extent to which these desirable characteristics are present. This is especially problematical for college courses because it is also assumed that the characteristics are universally desirable. Students and teaching faculty were also asked to compare on-campus courses with those delivered through distance education technologies on five characteristics and to compare on-campus and off-campus students on six characteristics. A closed-ended question format was used for these comparisons. Students and faculty were also asked the following open-ended question. In your opinion, what are the most significant differences between on-campus and off-campus courses?

Off-campus courses in agriculture are offered through a variety of delivery modes at Iowa State University. Most involve a communications medium such as the World Wide Web, videotape, and/or the ICN (a state-wide fiber optics telecommunications system that connects students and teachers who are separated by distance and allows them to share in real-time video, data, and voice instruction). A much less common arrangement involves teaching off-campus

ERIC Full Text Provided by ERIC

courses in a more traditional setting at a site far removed from the university campus. For this study, neither faculty nor students were instructed to focus their thoughts about off-campus courses on a specific delivery mode.

Miller et al. (1998) established content and face validity for the questionnaire. They reported Cronbach's alpha reliability coefficients of .90 and .84 for the on-campus and off-campus course quality scales, respectively. They also performed test-retest reliability analyses for the 11 closed-ended questions. The percentage agreement for the five items used to compare on-campus courses with those delivered by distance education technologies was 75, and the percentage agreement for the six items used to compare on-campus and off-campus students was 95. Miller et al. developed the questionnaire and established validity and reliability specifically for the teaching faculty population described in this study. The researchers concluded that the questionnaire was also suitable for use with the off-campus student population.

Data were collected from off-campus students in November 1997 and from faculty in February 1997. The questionnaire and a cover letter describing the purpose of the study were sent by U.S. mail to off-campus students and by campus mail to teaching faculty. Two complete follow-ups of nonrespondents were conducted. A postcard was sent to nonrespondents 10 days after the initial mailing encouraging them to respond, and a second mailing that included the questionnaire and a new cover letter was sent after 11 more days had past. Fifteen days after the last mailing to students and ten days after the last mailing to faculty, all subjects who had not completed and returned the questionnaire were considered nonrespondents.

Nonresponse error was controlled by randomly sampling 10% of the nonrespondents from each population and gathering data from them. Telephone interviews were used to gather data from the sample of nonrespondent off-campus students. Telephone contacts followed by face-to-face interviews were used to gather data from the sample of nonrespondent teaching faculty. The chi-square statistic was used to compare respondent and nonrespondent data for the off-campus student population on six randomly selected items taken from the course quality scales. A t-test was used to determine if respondents and nonrespondents from the teaching faculty population differed significantly in their overall perception of the quality of on-campus and off-campus courses. No significant ($p<.05$) differences were found between respondent and nonrespondent course quality data in either the off-campus student or faculty populations. The chi-square statistic was used to determine whether respondents and nonrespondents provided different results on the 11 closed-ended questions. No significant differences were found between the respondents and nonrespondents on the four randomly selected student and course characteristic comparisons for the off-campus student population. Significant differences were found on three of the five course characteristic comparisons for the teaching faculty population. These differences included relevance to students, amount of teacher-student interaction, and amount of student-student interaction. No significant differences were found on the six student characteristic comparisons for the teaching faculty population. Results were deemed generalizable to the respective populations, with one caveat. The reader is cautioned that findings for three of the five course characteristic comparisons may not accurately represent the perceptions of the faculty population. In total, 111 questionnaires were completed and returned by off-campus students for a response rate of 64.2%, and 142 questionnaires were completed and returned by faculty for a response rate of 54.2%.

All data were analyzed using SPSS for Windows personal computer program. Appropriate statistics for description were used including frequencies, percentages, means, and standard deviations. Since data were gathered from the population instead of a sample, inferential

statistics were not used for comparisons. Student and faculty responses to the open-ended question were analyzed for common themes related to quality.

RESULTS

Participating off-campus students and teaching faculty members were predominately male (71.6% and 93.6%, respectively). Off-campus students were on average 38 years of age, while faculty members were on average 50 years of age. Student respondents listed their primary occupations as: 28.2% in agribusiness, 24.5% in farming, 9.1% in agricultural education, 3.6% in agricultural extension, 3.6% as full-time students, and 26.4% as other. Most (67.6%) of the students were master's candidates. A majority (60.3%) of faculty members were professors. In terms of off-campus course exposure, students had taken an average of 3.5 courses off-campus during the last 3 years, while faculty members taught an average of 0.6 course sections off-campus in the last 3 years.

Table 1 shows that off-campus students provided a slightly higher mean on the course quality scale for on-campus courses. Students perceived the greatest quality advantage for on-campus courses to be on the transcendent factor. In other words, when compared to off-campus courses, students agreed more strongly that on-campus courses project a positive image of the institution, have a reputation of quality, and are acceptable to the public. On-campus courses were rated higher than off-campus courses on the manufacturing-based factor and on 8 of the 12 items for that subscale. Regarding the manufacturing-based quality factor, students agreed that a variety of assessment procedures were used in on-campus courses but were undecided about off-campus courses. In addition, students strongly agreed that students assume responsibility for their learning in off-campus courses but only agreed with the statement when applied to on-campus courses. The item with the greatest mean difference on this subscale concerned instructor availability. Students more strongly agreed that instructors were available to students on campus. Students rated off-campus courses higher on the user-based quality factor and on four of five items from that subscale. Regarding the user-based factor, students agreed that off-campus courses were adjusted to meet student needs but were undecided about on-campus courses. Students perceived on- and off-campus courses to be almost equal on the value-based factor. They agreed that on-campus courses provided quality instruction at an acceptable cost yet were undecided for off-campus courses.

Overall, faculty provided a slightly higher mean score on the course quality scale for on-campus courses than did students. The magnitude of the differences between student and faculty perceptions was small, however. Faculty provided a higher mean score than students on the value-based quality factor and each of the three items on this subscale. Faculty also provided a higher mean score on the user-based quality factor. Regarding user-based quality, faculty agreed that on-campus courses were adjusted to meet student needs while students were undecided. Students provided a higher mean score than faculty on the transcendent quality factor and each of the items on this subscale. Overall, students and faculty provided the same mean score for the manufacturing-based quality factor. Interestingly, students agreed that departments support courses while faculty were undecided (Table 1).

Students provided a higher overall mean score for the quality of off-campus courses than did faculty. They also provided higher means on 16 of 23 items from the course quality scale. The most notable differences in student and faculty perceptions were on the manufacturing-based factor. Students agreed that instructors were available to students, the learning environment was

of high quality, students used instructor support, and departments supported courses, while faculty were undecided about each of these items. Faculty, on the other hand, agreed that a variety of assessment procedures were used in off-campus courses but students were undecided. Students provided higher mean scores on the user-based and transcendent-based factors for off-campus courses than did faculty. Faculty provided a higher mean on the value-based factor and agreed that students receive quality instruction at an acceptable cost in off-campus courses while students were undecided (Table 1).

Students and faculty responded to five closed-ended statements comparing distance education courses with on-campus courses. Table 2 shows that a majority of faculty and students perceived on- and off-campus courses to be equally relevant to students and they agreed that the amount of teacher-student and student-student interaction was less in off-campus courses. Faculty were more likely than students to indicate that less material was covered in off-campus courses, and were more likely to indicate that off-campus courses were more organized. The reader is reminded that significant differences were found between respondents and nonrespondents for the teaching faculty population on three of the five course characteristic comparisons. These differences included relevance to students, amount of teacher-student interaction, and amount of student-student interaction.

Students and faculty responded to six closed-ended statements comparing off-campus students with on-campus students. Table 3 shows that faculty were more likely than students to rate off-campus students lower on academic ability, background in prerequisite courses, the likelihood of completing the course on time, the likelihood of submitting assignments on time, and the likelihood of using library resources. Students and faculty provided similar ratings for on- and off-campus students on the level of relevant work experience.

Students provided a number of comments that shed light on the issue of quality in off-campus courses. They were generally positive in the assessment of off-campus courses, but many comments indicate that there are areas in need of substantial improvement, particularly on the manufacturing-based quality factor. A selection of student comments follows.

> These options are much better than no contact or furthering of one's education.... Many students of off-campus/distance learning would not ever receive a class after B.S. graduation were it not for these off-campus opportunities.
>
> The classes are very high quality. It is the enrollment process and getting course planning advice that needs help.

ERIC

Table 1. Means and standard deviations for perceptions of course quality

	Students				Faculty			
	On-Campus		Off-Campus		On-Campus		Off-Campus	
Factors and abbreviated items	Mean[a]	SD	Mean[a]	SD	Mean[a]	SD	Mean[a]	SD
Manufacuturing-Based	**3.96**	**.40**	**3.87**	**.56**	**3.96**	**.55**	**3.69**	**.55**
Instructors know the subject matter well	4.36	.57	4.36	.60	4.40	.56	4.33	.64
Instructors are available to help students	4.06	.55	3.54	1.09	4.23	.65	3.19	1.02
Courses represent instructors' best efforts	3.98	.80	3.89	.97	4.12	.78	3.94	.92
Instructors effectively present information	3.98	.64	3.84	.81	4.07	.74	3.93	.81
Current information is presented	4.11	.59	4.19	.72	4.08	.75	4.08	.70
The learning environment is of high quality	4.02	.56	3.65	.89	3.99	.77	3.35	.88
Students assume responsibility for their learning	4.00	.65	4.52	.62	3.97	.83	4.17	.83
A variety of teaching methods is used	3.90	.69	3.81	.92	3.94	.78	3.62	.89
High-quality teaching materials are used	4.03	.61	3.96	.82	3.92	.76	3.89	.77
A variety of assessment procedures is used	3.69	.81	3.47	.93	3.80	.96	3.50	.97
Students use instructor support	3.53	.84	3.58	.89	3.49	.98	3.15	.86
Departments support courses	3.89	.76	3.60	.99	3.48	1.07	3.07	1.13
User-Based	**3.83**	**.50**	**3.96**	**.55**	**3.92**	**.57**	**3.89**	**.62**
Students are better off having taken the course	4.12	.63	4.22	.56	4.26	.67	4.21	.75
Courses are helpful to students' careers	4.07	.68	4.16	.60	4.21	.63	4.19	.73
Student needs are fulfilled	3.97	.51	3.72	.90	3.89	.70	3.70	.76
Courses are adjusted to meet student needs	3.47	.91	3.93	.86	3.74	.92	3.82	.92
Courses are adjusted to student interests	3.52	.86	3.77	1.01	3.50	.94	3.54	.92
Value-Based	**3.86**	**.55**	**3.85**	**.66**	**4.09**	**.56**	**4.00**	**.62**
Courses are valuable to students	4.07	.56	4.12	.62	4.17	.59	4.05	.66
Students receive quality instruction at an acceptable cost	3.71	.85	3.42	1.05	4.10	.73	3.88	.86
What is learned will have long-term usefulness	3.79	.76	4.01	.71	4.01	.81	4.06	.85
Transcendent	**4.14**	**.49**	**3.91**	**.62**	**4.08**	**.55**	**3.77**	**.67**
Courses project a positive image of the institution	4.17	.54	4.00	.83	4.12	.70	4.04	.78
Courses have a reputation of high quality	4.16	.56	3.91	.76	4.10	.62	3.65	.86
Level of course quality is acceptable to the public	4.09	.62	3.83	.66	4.02	.74	3.65	.85
Overall Mean	**3.94**	**.39**	**3.89**	**.50**	**3.99**	**.52**	**3.78**	**.54**

[a] 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree

The professor of our class doesn't seem to care too much about the off-campus students. We've taken two exams and it's about time for our third and we still haven't gotten our first one back. It's hard to stay motivated without feedback. I think if professors are willing to consider us as real students then the courses have the potential to be just as useful as on-campus courses.

Courses taught on videotape are not monitored for quality prior to shipping to students.... In a recent lecture the camera slowly moved upward until the ceiling was the only thing that could be seen.

The biggest drawback I have seen is the inability of instructors to adapt instruction to the distance setting.

I wrote the professor e-mails asking questions and for clarification and never got an answer. The video class was poorly organized, the tapes were very poorly videoed, the printed materials came six weeks after the start of class and videos came three weeks after the start of class.

The off-campus class I am taking is very unorganized as far as syllabus content, test dates, and receiving our materials back. Instructor assumes we have Internet access, but we don't! The taped lectures we watch have poor sound quality and the camera isn't always focused. They are extremely boring to watch!

Table 2. Comparing courses delivered by distance education technologies to courses taught on-campus

	Less		Equal		Greater	
Factor	S	F	S	F	S	F
Relevance to students	7.5	8.7	65.4	65.3	27.1	26.0
Amount of material covered	11.2	42.9	80.4	50.8	8.4	6.3
Level of organization	25.2	7.9	51.4	47.2	23.4	44.9
Amount of teacher-student interaction	70.1	87.0	22.4	9.2	7.5	3.8
Amount of student-student interaction	86.8	87.0	9.4	9.9	3.8	3.1

Note. Values presented are percentages. S = students. F = faculty.

Table 3. Comparing students who enroll in off-campus courses with those who study on-campus

	Less		Equal		Greater	
Factor	S	F	S	F	S	F
Level of academic ability	3.7	30.5	72.0	62.5	23.4	6.9
Level of relevant work experience	2.8	4.6	17.8	16.8	79.4	78.6
Level of background in prerequisite courses	16.2	66.4	72.4	30.5	11.4	3.1
Likelihood of completing the course on time	15.1	39.2	64.2	56.9	20.8	3.8
Likelihood of submitting assignments on time	25.5	38.0	59.4	56.6	15.1	5.4
Likelihood of using library resources	80.2	87.0	8.5	11.5	11.5	1.5

Note. Values presented are percentages. S = students. F = faculty.

ERIC

CONCLUSIONS AND RECOMMENDATIONS

Faculty and students provided a positive assessment of the overall quality of both on- and off-campus courses. They also provided a positive assessment of both on- and off-campus courses on the manufacturing-based, user-based, value-based, and transcendent-based quality factors. Even so, both students and faculty perceived off-campus courses to be of lower quality than on-campus courses with the greatest difference on the transcendent quality factor. Overall, results of this study strongly support the conclusions and recommendations made by Miller et al. (1998), while adding some additional insight.

Students indicated that off-campus courses were superior to on-campus courses on the user-based quality factor and equal to on-campus courses on the value-based factor. Faculty also rated these factors relatively high for off-campus courses. It was concluded that off-campus courses are fulfilling important educational needs. Faculty and administrators should maintain their commitment to providing courses that are adapted to the needs and interests of off-campus learners. Courses that are student-centered will more likely have long-term usefulness to the characteristically practical off-campus learner.

Students rated on-campus courses higher than off-campus courses on the manufacturing-based quality factor as did faculty. Relative to faculty, students were more positive about off-campus course quality. Clearly the focus for improving the quality of off-campus courses must be on the manufacturing-based factor. When the production and delivery processes are handled correctly and aligned to achieve outcomes based on student needs, off-campus courses will be recognized for innate excellence (transcendent quality). Based on faculty data, Miller et al. (1998) emphasized the need for faculty development and support to enhance quality. Their recommendation is supported by this study, but student data suggest that many needed improvements are beyond faculty control. If quality off-campus courses in agriculture are to be offered, attention must be given to improving the production, quality control, and distribution systems for courses and course materials. In addition, efforts are needed to enhance course enrollment policies and procedures. As the production and delivery of off-campus courses improves, a reputation of quality will develop and enrollment will likely grow.

ERIC

REFERENCES

Davis, J. A. (1971). Elementary survey analysis. Englewood Cliffs, NJ: Prentice-Hall.

Dillon, C. L. & Walsh, S. M. (1992). Faculty: The neglected resource in distance education. The American Journal of Distance Education, 3(6), 5-21.

Garvin, D. A. (1984). What does "product quality" really mean? Sloan Management Review, 26, 25-43.

Gilbert, J. P., Keck, K. L. & Simpson, R. D. (1993). Improving the process of education: Total quality management for the college classroom. Innovative Higher Education, 18(1), 65-85.

Miller, G. & Shih, C. C. (1998, March). College of agriculture teaching faculty perceptions of academic rigor in on- and off-campus courses. Proceedings of the Central Region 52nd Annual Research Conference in Agricultural Education, St. Louis, MO.

Olcott, D., Jr. (1991). Bridging the gap: Distance learning and academic policy. Continuing Higher Education Review, 55 (1&2), 49-60.

Sallis, E. (1993). Total quality management in education. London: Kogan Page Limited.

Schwartz, S. A. & Peterson, S. L. (1993). Perceptions of quality: Implications for the retention of students in postsecondary vocational education programs. The Journal for Vocational and Special Needs Education, 15 (3), 3-18.

Seymour, D. T. (1993). On Q: Causing quality in higher education. Phoenix, AZ: Oryx Press.

Verduin, J. R., Jr. & Thomas, A. C. (1991). Distance education: The foundations of effective practice. San Francisco, CA: Jossey-Bass.

THE QUALITY OF ON- AND OFF-CAMPUS COURSES: A COMPARISON OF THE PERCEPTIONS HELD BY OFF-CAMPUS STUDENTS AND AGRICULTURE TEACHING FACULTY

A Critique

James J. Connors, PhD
University of Idaho

Quality is a hard characteristic to judge. Scholars have for centuries asked the question, what is quality teaching? In today's educational environment one not only has to be concerned with quality of teaching in traditional on-campus courses, but also in distance courses where the instructor may be hundreds of miles away or a "talking head" on a video tape.

This study sought to investigate perceptions of quality of on- and off-campus courses from off-campus students and college of agriculture faculty. The researcher(s) made a major leap to assume that off-campus students had taken an on-campus course. While the entry requirements into the off-campus distance delivered program seem to insinuate that students must have had an on-campus course, I'm sure there are exceptions. Could these off-campus students have completed their general education requirements at a community college or at another four-year institution in the state prior to transferring to the Off-Campus Professional Agriculture Degree Program?

The study also grouped all forms of distance delivered course together. Respondents were not asked to differentiate their responses for web delivered courses, videotape courses, course offered over the statewide fiber optics system, or even courses taught live by faculty at off-campus locations. Being that there are different delivery methods that can have wide ranging levels of quality, is it appropriate to group all forms of delivery together in this study?

It was interesting to note that of the students responding to the study had taken an average of 3.5 off-campus courses over the past 3 years. However, faculty members only taught an average of 0.6 sections of off-campus courses over the pervious 3 years. Do faculty who may only teach one off-campus course in three years have enough knowledge and experience to properly judge the quality of off-campus courses? Also, are they basing their judgements on their courses alone, or have they observed colleagues in the college of agriculture teaching other distance delivered courses?

The results showed that off-campus students agreed that instructors were available to students on-campus. Faculty agreed that the amount of teacher-student interaction was less in off-campus courses. Clearly, faculty can interact with students before and after class in on-campus courses. My question is why can't this happen in off-campus courses as well? With today's technology, why can't faculty schedule office hours that utilize the telephone, fax, email, web-based chat rooms, or even web cams to interact with off-campus students? Is this too hard for faculty to accomplish, does it take too much time, are faculty inept at using this technology? Or is it they just don't want to give the extra effort required to meet the needs of off-campus students?

ERIC

Another problem that was evident was off-campus students' problems with non-teaching aspects of off-campus courses. Program advising, enrollment, course materials, evaluations, and quality of videotapes all seemed to be significant problems. While these course management problems could be corrected with better program coordination by the college, is it not the instructor's responsibility to oversee all aspects of their course?

ERIC Full Text Provided by ERIC

NAERC '99
Research Fresh from Florida

Faculty Perceptions of a Web-Based Master of Science in Agronomy Distance Education Degree Program and Web-Based Distance Education in General


Kevin Born
Iowa State University

Greg Miller
Iowa State University

BACKGROUND

The Agronomy Department at Iowa State University is currently developing a new Master of Science Distance Education (DE) Degree Program intended for individuals working in an agronomy-related field in either industry or government who need additional training for professional advancement. These individuals are often unable to pursue an advanced degree because employment and family commitments preclude their returning to campus. The need for an alternative graduate program to meet the educational needs of those persons was recognized and pursued. Fifteen individuals from within the state began course work in this web-based Master of Science Degree Program in the fall of 1998. This web-based degree program will be open for enrollment to Iowa residents in the fall of 1999.

Faculty play a major role in the development and success of any new degree program. This is especially true for distance learning degree programs. Because success or failure of degree programs is so dependent on faculty, their concerns and perceptions must be understood (Schurle, 1997). Until now there has been no data collected about the faculty's perception of web-based DE and, more specifically, the Master of Science in Agronomy DE Degree Program.

ERIC

INTRODUCTION

Distance education has long been based on the premise of delivering education to people who do not have access to or whose career does not allow them to participate in, a campus-based curriculum. Reasons for being in this category include financial costs, career demands, family commitments, and/or geographic obstacles. Time and convenience issues play a major part in the need for DE. Many people in this evolving group are professionals who are seeking relevant information that is specific to their career field (Butler, 1996). The Master of Agriculture degree in the Department of Animal Science at Texas A&M University is one example of a degree aimed at providing an education for students in agriculture-related businesses while allowing a flexible graduate degree schedule (Miller et al., 1998). Many other universities have similar programs aimed at serving this group of individuals, and for one reason or another this group continues to grow and evolve creating a challenge for all universities and colleges (Telg & Cheek, 1998).

Despite this outreach, DE is constantly being scrutinized as to the quality and rigor of the classes or programs it delivers. Miller and Shih (1998a,b) showed that faculty perceived the quality and rigor of off-campus courses and programs to be lower than that of traditional on-campus courses. Because of this bias, new DE programs must be ready for the inevitable opposition and challenge. Understanding how quality is measured is the first step toward overcoming this prejudice. The perception of quality in DE programs depends on the criteria or standards used to evaluate the program. Each stakeholder, such as the student, educator, or industry, will have different criteria they use to evaluate the quality of the program (Middleton, 1997). Middleton (1997) continues to suggest that from an educator's point of view, issues such as cost effectiveness, educator workload, level of interaction between teacher and student, and the ability of the students to cooperatively form groups and problem solve must be evaluated. The idea that DE is mass education must be overcome and attitudes changed if we are to create the perception that DE is a viable and equal alternative to an on-campus program. Distance education courses require that educators be aware that they are developing lessons for or actually teaching to an audience that is not physically present (Diebel et al., 1998). Some DE courses are based on traditional models of teaching and are simply reproductions of courses taught on campus without any thought to the differing needs of the students (Saltzberg & Polyson, 1995; Duchastel, 1997). Developing this new mind-set is just one of the issues to be confronted in order to provide quality DE programs and to improve the overall perception of DE.

Meeting the needs and goals of students in the 21st century is an important necessity of higher education (Herr & Parsons, 1995). Technology has played and will continue to play a major role in meeting the ever changing needs of the students. Massy and Wilger (1998) explained that DE coupled with technology is not mass education, but rather mass customization. Technology provides the ability to accommodate individual differences in educational goals, learning styles, and abilities while allowing the convenience to access this information any time and from any place.

Distance education in general has expanded rapidly, and yet there are still more tools at the instructor's disposal to educate the distance learners. Web-based DE is one of those tools that can be very effective for teaching individuals who need a very flexible schedule (Telg & Cheek, 1998; Saltzberg & Polyson, 1995; O'Kane & Armstrong, 1997).

ERIC

Web-based instruction allows self-paced learning and evaluation, offering students some immediate feedback on their ability to comprehend the information. The world wide web (WWW) provides powerful, new resources for education in agriculture. The Web is very different from any other teaching tool we have ever known (O'Kane & Armstrong, 1997). We are able to exchange documents, images, video, sound, and other electronic information formats. Students need to be provided with choices in instructional methods in order to maintain motivation and attention, and to address the individuals' different learning styles (Miller, 1997; Seiler et al., 1997). Those educators that have explored this resource have experienced a rapid transition from typical lecture type formats, to interactive student centered Internet courses (Oliver et al., 1998). This transition requires instructors to develop new skills for curriculum development and delivery and to keep up-to-date on the quickening pace of technology adoption and change in the Internet areas (Diebel et al., 1998; Miller & Powell, 1998).

A wide spectrum of use of the WWW can be found in educational settings beginning with the use of the WWW to supplement teaching and extending to the creation of virtual classrooms (Saltzberg & Polyson, 1995). Even schools that have a long reputation for effective DE must continue to learn or relearn how to deliver educational programming. Universities have long been known for their ability to be on the cutting edge of instructional techniques and development, but they seem to be lagging in the adoption of web-based technology (Telg & Cheek, 1998). Miller (1995, p.10) wrote, "Today's youth are much more accustomed to learning from electronic products than are the faculty who teach the classes. Higher education no longer holds the monopoly on information packaging and transfer." Individual educators and institutions of higher education are under increasing pressure to reevaluate their positions as well as constantly improve the development of effective teaching strategies (Miller & Powell, 1998; Miller, 1995; Diebel et al., 1998).

Massy and Wilger (1998) noted some of the reasons that universities and faculty are reluctant to adopt and use these new resources. A major reason is that there are no established institutional norms relating quality to the use of technology. Another reason is that faculty, if given the chance, will use money to hire another faculty member before purchasing new technology. It is difficult to get faculty to think of productivity in terms other than scholarship and research. This concept is quantified by Fasenko et al. (1996) in which a survey of North Carolina State University faculty showed that faculty do not believe teaching is valued highly by administration. Learning accomplishments usually do not make that list of productivity in many minds.

Adoption of this type of instruction depends heavily on the perception and attitudes of faculty surrounding web-based DE. Understanding the faculty's perceptions and attitudes is the first step in gaining respect for this newfound method of instruction (O'Kane & Armstrong, 1997; Lawless & Smith, 1997). As with any new tool, the need to be cautious hangs in the air. The key is to use the technology to bring the subject matter to life for the students and not to allow the technology to become the focal point. There is a thin line that should not be crossed between controlling the technology and the technology controlling us (Herr & Parsons, 1995).

PURPOSE AND OBJECTIVES

The purpose of this study was to investigate faculty perceptions of web-based DE in general and of the Master of Science in Agronomy Distance Education Degree Program specifically. The objectives of the study were as follows:

1. Describe faculty perceptions of web-based DE.
2. Describe faculty perceptions of the Master of Science in Agronomy Distance Education Degree Program.
3. Determine whether faculty perceptions were associated with selected faculty characteristics.

PROCEDURES

The population (N=72) for this quantitative descriptive study consisted of all Assistant, Associate, and Full Professors in the Agronomy Department at Iowa State University.

The questionnaire used for this study had three sections. The first and second sections included Likert-type statements inquiring into the faculty's perceptions of web-based DE and the M.S. in Agronomy Degree Program. Section one contained general statements pertaining to an overall perception of web-based DE programs. Section two contained specific statements about faculty perceptions of the M.S. in Agronomy Degree Program compared with on-campus programs and other similar degrees. The answers in these two sections were rated from one for "strongly disagree" to five for "strongly agree." Section three contained general demographic questions as well as specific questions about familiarity with and involvement in the M.S. in Agronomy Degree Program.

The perception instruments used were developed by the researchers and reviewed for content and face validity by a panel of experts. This panel consisted of one professor and two graduate students from the department of curriculum and instruction, two professors and one adjunct professor from the department of agronomy, and one professor from the department of agricultural education and studies. The two professors in agronomy that served on the panel of experts were also asked to participate in the survey. Reliability of the data was established by calculating internal consistency using Cronbach's alpha. Cronbach's alpha was 0.88 for the overall perception of web-based DE and 0.63 for the perception of the Master of Science in Agronomy Distance Education Degree Program.

During fall semester of 1998, the questionnaire was mailed to all members of the population with a cover memo from the interim department head explaining the purpose of the study and asking them to complete the questionnaire and return it. A reminder e-mail was sent to all faculty two days before the return deadline. A total of 42 faculty members (58%) completed and returned the questionnaire. No additional follow-ups were conducted.

Nonresponse error was addressed by comparing respondents with the population on a known characteristic as explained by Miller and Smith (1983). The group that returned the questionnaire included 22 (54%) Professors, 13 (31%) Associate Professors, and 6 (15%) Assistant Professors. This was in comparison to the population, which consisted of 52% Professors, 27% Associate Professors, and 20% Assistant Professors. Despite the strong correlation based on rank, the reader is cautioned that the conclusions found may not necessarily represent the entire agronomy faculty.

Data were analyzed with the SPSS for Windows personal computer program. Means and standard deviations for the Likert-type items were used to summarize the responses. Negatively worded statements were reverse coded for analysis. One-way analysis of variance and t-tests were used to determine whether faculty perceptions depended on selected faculty characteristics. The alpha level was set at .05 for determining statistical significance.

RESULTS

On average the faculty had held the Ph.D. degree for twenty-one years. Fifty-nine percent of the faculty listed research as their primary position responsibility whereas 23% listed teaching and 18% listed extension. Thirty percent of the faculty were involved in DE other than the M.S. in Agronomy Degree Program whereas 70% indicated that they had no other involvement in DE. Sixty-two percent of the faculty indicated that they were familiar with the M.S. in Agronomy Degree Program but 38% felt that they were not familiar with the program. Sixty percent of the faculty were not involved in the M.S. in Agronomy Degree Program whereas 40% were in some way associated with the program. This involvement ranged from being an instructor of an M.S. in Agronomy Degree Program course to providing administrative support for the program.

Regarding perception of web-based DE, faculty were undecided, with a mean response of 3.46 (Table 1). The most positive perceptions held by the faculty were that web-based DE courses can be as challenging as on-campus courses, web-based DE courses should become an integrated part of the university curricula, and the department needs to develop more web-based DE courses. The least positive views were that on-line degrees should be valued as equivalent to on-campus degrees, that effective student/professor interaction is possible in web-based DE courses, and that teaching DE courses would improve on-campus teaching.

Faculty were also undecided about their perception of the M.S. in Agronomy DE Degree Program (Table 1). The most positive perception held by the faculty was that the time and effort expended on the M.S. in Agronomy Degree Program was appropriate. The least positive views were that the M.S. in Agronomy degree will be perceived by employers as having similar value compared with an on-campus M.S. and that the M.S. in Agronomy Degree Program is as rigorous as an on-campus M.S. The reader is cautioned that comparing the data for overall perceptions of web-based DE generally with the M.S. in Agronomy Degree Program specifically is not appropriate in this study. The scales used to measure each construct were distinctly different.

ERIC

Table 1. Means and standard deviations for faculty perceptions of web-based distance education and the M.S. in Agronomy Distance Education Degree Program

Statement	Mean[a]	SD
Overall perception of web-based distance education	**3.46**	**.63**
Web-based, distance education courses can be as challenging as on-campus courses.	4.00	.92
Web-based, distance education courses should become an integrated part of university curricula.	3.98	.75
Our department needs to develop more web-based, distance education courses.	3.67	.93
If I were a student, I would consider enrolling in a web-based, distance education course or program.	3.50	.89
Web-based, distance education courses are as academically challenging as on-campus courses.	3.43	.91
Web-based, distance education courses should be offered as substitutes for some on-campus courses.	3.38	1.03
Web-based, distance education courses can not be as effective as on-campus courses.	3.33[b]	1.14
Students spend less time working on web-based, distance education courses than on-campus courses.	3.33[b]	.61
I would consider teaching a web-based, distance education course.	3.31	1.07
Teaching a distance education course would improve my on-campus teaching.	3.31	1.05
Effective student-professor interaction is not possible in web-based, distance education courses.	3.26[b]	.96
On-line degrees should not be valued as equivalent to on-campus degrees in the job market.	2.98[b]	.14
Overall perception of the M.S. in Agronomy Degree Program.	**3.15**	**.59**
The time and effort expended on the Master of Science in Agronomy Distance Education Degree Program is not appropriate.	3.27[b]	.59
A Master of Science in Agronomy Distance Education Degree Program will be perceived by employers as having similar status or value as compared to an on-campus Master of Science degree.	3.10	.77
The Master of Science in Agronomy Distance Education Degree Program is as rigorous as an on-campus Master of Science Degree Program.	3.10	.94

[a] 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree; [b] Indicates negatively worded items that were reverse coded.

Professors had the highest mean response for both the overall perception of web-based DE and the M.S. in Agronomy Degree Program (Table 2). Assistant Professors had the lowest mean response for the overall perception of web-based DE and Associate Professors had the lowest mean response for the M.S. in Agronomy Degree Program. Faculty whose primary responsibility was extension had the highest mean response for the overall perception and faculty whose primary responsibility was teaching had the highest mean response for the M.S. in Agronomy Degree Program (Table 3). Faculty whose primary responsibility was research had the lowest mean response for both the web-based DE in general and the M.S. in Agronomy Degree Program. The overall perception of web-based DE was higher and the perception of the M.S. in Agronomy

ERIC

Degree Program significantly higher if the faculty member was involved in other DE (Table 4). Faculty had a significantly higher response for both the web-based DE and perception of the M.S. in Agronomy Degree Program if they were familiar with the M.S. in Agronomy Degree Program (Table 5). Overall perception of web-based DE was higher and perception of the M.S. in Agronomy Degree Program significantly higher if the faculty were involved with the M.S. in Agronomy Degree Program (Table 6). Both overall perception of web-based DE and the perception of the M.S. in Agronomy Degree Program had significantly higher mean responses when the faculty had viewed an M.S. in Agronomy Degree Program lesson (Table 7).

Table 2. A comparison of perceptions by faculty rank

		Web-Based[b]		Agronomy Program[c]	
Variable	N	Mean[a]	SD	Mean[a]	SD
Professors	22	3.51	.67	3.26	.64
Associate Professors	13	3.41	.42	2.89	.36
Assistant Professors	6	3.18	.75	3.11	.54

[a] 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree;
[b] F=.68 (2,37) p>.05; [c]F=1.69 (2,37) p>.05

Table 3. A comparison of perceptions by faculty members' primary responsibility

		Web-Based[b]		Agronomy Program[c]	
Variable	N	Mean[a]	SD	Mean[a]	SD
Research	23	3.37	.64	2.97	.63
Teaching	9	3.41	.78	3.41	.46
Extension	7	3.68	.30	3.29	.36

[a] 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree;
[b] F=.57 (2,35) p>.05; [c]F=2.29 (2,35) p>.05

Table 4. A comparison of perceptions by involvement in other distance education (DE) courses

		Web-Based[b]		Agronomy Program[c]	
Variable	N	Mean[a]	SD	Mean[a]	SD
Not involved in DE	32	3.38	.61	3.03	.55
Involved in DE	10	3.70	.66	3.53	.57

[a] 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree;
[b] t=-1.40 (39) p>.05; t=-2.47 (39) p<.05

Table 5. A comparison of perceptions by familiarity with the M.S. in Agronomy Degree Program

		Web-Based[b]		Agronomy Program[c]	
Variable	N	Mean[a]	SD	Mean[a]	SD
Not familiar with the MOAP[d]	16	3.30	.61	2.93	.54
Familiar with the MOAP	26	3.70	.61	3.50	.52

[a] 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree;
[b] t=-2.15 (39) p<.05; t=-3.35 (39) p<.05; [d] MOAP=Master of Agronomy Program.

Table 6. A comparison of perceptions by involvement in the M.S. in Agronomy Degree Program

		Web-Based[b]		Agronomy Program[c]	
Variable	N	Mean[a]	SD	Mean[a]	SD
Not involved in the MOAP[d]	25	3.36	.59	2.99	.50
Involved in the MOAP	17	3.60	.68	3.34	.65

[a] 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree;
[b] t=-1.23 (39) p>.05; t=-2.27 (39) p<.05; [d] MOAP=Master of Agronomy Program.

Table 7. A comparison of perceptions by whether faculty had viewed an M.S. in Agronomy Degree Program lesson

		Web-Based[b]		Agronomy Program[c]	
Variable	N	Mean[a]	SD	Mean[a]	SD
Have not viewed a lesson	26	3.22	.60	2.88	.46
Viewed a lesson	16	3.83	.49	3.58	.52

[a] 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree;
[b] t=-3.41 (39) p<.05; t=-4.52 (39) p<.05

CONCLUSIONS AND RECOMMENDATIONS

The data gathered from the agronomy faculty survey provided valuable insight on how the faculty perception of the Master of Science in Agronomy Distance Education Degree Program could be enhanced. It also provided the Department with a base from which to work in order to improve overall perceptions of web-based DE. The following conclusions and recommendations were drawn from the findings.

1. Overall, the faculty were undecided about web-based DE and the M.S. in Agronomy Degree Program. There is ample room for improvement inasmuch as less than 60% of the faculty considered themselves to be familiar with the M.S. in Agronomy Degree Program. It was recommended that faculty seminars focusing on the M.S. in Agronomy Degree Program be held and that major events of the program be announced in the department newsletter.

2. There was no correlation between faculty rank or primary position responsibility and perception of either web-based DE or the M.S. in Agronomy Degree Program. Efforts to familiarize and inform about the M.S. of Agronomy Degree Program and web-based DE should focus on the faculty as a whole and not single any one group out.

3. Perceptions of web-based DE were significantly higher for faculty who were involved in the M.S. in Agronomy Degree Program or other DE. Faculty should have an open invitation to participate in the development of this program. Follow-ups should be conducted with the faculty participants to explain and show them where their particular contribution was used.

4. Perceptions of the M.S. in Agronomy Degree Program were significantly higher if the faculty were involved in the M.S. in Agronomy Degree Program, involved in other DE, familiar with the M.S. in Agronomy Degree Program, or had viewed an M.S. in Agronomy Degree Program lesson. It was recommended that a more interactive M.S. in Agronomy Degree Program website be developed outlining the mission and educational objectives and allowing the visitor to view an example lesson. The M.S. in Agronomy Degree Program's URL should be printed in the department newsletter highlighting the
fact that it is something new and innovative.

5. Faculty agree that web-based DE can be as challenging as on-campus courses and that the department needs to continue to develop these types of courses, but their greatest concerns are the effectiveness of student/professor interactions and the overall quality of a web-based degree. It was recommended that examples of student/material, student/instructor, and student/student interactions be integrated into the seminars and the program's website.

REFERENCES

Butler, B. S. (1996). Continuous education: A model for WWW based education. [On-line]. Available: http://www.umuc.edu/iuc/cmc96/papers/butler-p.html.

Butler, B. S. (1995). Using the World Wide Web to support classroom based education: Challenges and opportunities for IS Educators. Proceedings of the Association of Information Systems Conference (AIS), Pittsburgh, PA. [On-line]. Available: http://www.gsia.cmu.edu/bb26/papers/education/aiswww/.

Diebel, P. L., M.L. McInnis, & W.D. Edge. (1998). Student use and perceptions of distance education technologies. NACTA Journal, 42 (1), 24-31.

Duchastel, P. (1997). A web-based model for university instruction. Journal of Educational Technology Systems, 25 (3), 221-228.

Fasenko, M. G., G. E. Moore, & J. L. Flowers. (1996). Faculty and graduate student perceptions of teaching importance with respect to faculty rewards. NACTA Journal, 40 (4), 36-38

Herr, L. M., & J. M. Parsons. (1995). Case study using the internet to teach communication skills to the novice. NACTA Journal, 39 (2), 9-12.

Lawless, K. A., & E. V. Smith, Jr. (1997). Teacher beliefs about instructional media: confirmatory factor structure. International Journal of Instructional Media, 24 (3), 191-196.

Massy, W. F., & A. K. Wilger. (1998). Technology's contribution to higher education productivity. New Directions for Higher Education, 103, 49-59.

Middleton, A. J. (1997). How effective is distance education?. International Journal of Instructional Media, 24 (2), 133-137.

Miller, B. A., J. R. Noska, M. W. Murphey, T. R. Greathouse, J. H. Hesby, C. L. Skaggs, & W. S. Ramsey. (1998). The master of agriculture in the department of animal science at Texas A&M University: An opinion survey analysis and results comparison. NACTA Journal, 42 (2), 27-32.

Miller, F. P. (1995). Forces driving changes in colleges of agriculture. Journal of National Resources and Life Sciences Education, 24 (1), 9-13.

Miller, G. (1997). Cognitive style preferences of agricultural distant learners. NACTA Journal, 41 (4), 23-28.

Miller, G., & N. L. Powell. (1998). Teaching strategies for agricultural distance educators. NACTA Journal, 42 (4), 52-55.

Miller, G., & Shih, C. C. (1998a). College of agriculture teaching faculty perceptions of academic rigor in on- and off-campus courses. Proceedings of the Central Region 52nd Annual Research Conference in Agricultural Education, St. Louis, MO.

Miller, G., & Shih, C. C. (1998b). College of agriculture teaching faculty perceptions of quality in on- and off-campus courses. Proceedings of the Central Region 52nd Annual Research Conference in Agricultural education St. Louis, MO.

Miller, L., & Smith, K. (1983). Handling non-response issues. Journal of Extension, 21(5), 45-50.

O'Kane, M., & J. D. Armstrong. (1997). Developing course materials using the World Wide Web. NACTA Journal, 41 (2), 10-12.

Oliver, R., A. Omari, & J. Herrington. (1998). Investigating implementation strategies for WWW-based learning environments. International Journal of Instructional Media, 25 (2), 121-138.

Saltzberg, S. & S. Polyson. (1995). Distributed learning on the World Wide Web. [On-line] Available: http://www/syllabus.com/archive/Syll95/07 sept95/DistrLrngWWWeb.txt.

Schurle, B. (1997). What are we going to do with all of this technology stuff?. NACTA Journal, 41 (4), 7-11.

Seiler, J.R., J.A. Peterson, C.D. Taylor, & P.P. Feret. (1997). A computer-based multimedia instruction program for woody plant identification. Journal of National Resources and Life Sciences Education, 26 (1), 129-131.

Telg, R. W., J. G. Cheek. (1998). A case study of distance education programming in a college of agriculture. NACTA Journal, 42 (3), 31-37.

FACULTY PERCEPTIONS OF A WEB-BASED MASTER OF SCIENCE IN AGRONOMY DISTANCE EDUCATION DEGREE PROGRAM AND WEB-BASED DISTANCE EDUCATION IN GENERAL

A Critique

James J. Connors, PhD
University of Idaho

As more and more off-campus agribusiness professionals seek Bachelors or Master's degrees to improve their professional careers, colleges of agriculture will need to offer new means of providing higher education programs. Students who are place-bound are always looking for individual courses or programs that meet the personal and professional needs.

As colleges initiate agriculture distance education programs, it is vitally important to study stakeholders' opinions of the new programs. This study asked faculty within the Agronomy Department at Iowa State University to provide their perceptions of the new Master of Science Distance Education Programs offered through web-based courses. It would have been interesting to know how faculty in other departments perceived the new web-based Master's degree program. It seemed obvious that faculty in the Agronomy Department, and especially those who were associated with the program (40%), would have higher perceptions of the new program.

It was interesting to see that the faculty agreed that the time and effort expended on the web-based Master's program was appropriate. If new programs such as this, especially distance education programs, are to survive, they must have the "buy-in" of major stakeholders such as faculty within the department offering the program.

It was not too surprising to see that faculty with research appointments (59%) had the lowest perceptions of both web-based courses in general and the M.S. program specifically. The researchers did not indicate if any of the research faculty had ever taught academic courses, either on-campus or off-campus. As the Agronomy Department continues the development of the web-based Master's degree program, could research and extension faculty within the department be utilized to teach specific courses in the program? This would hopefully further education them about the program and allow them to gain instructional experience in distance education courses. Evidence of this can be found in that faculty who had been involved with distance education, or even taught a distance education course, had higher perceptions of web-based courses and the Master's degree specifically.

I agree with the researchers in their call for more informational programs to educate the faculty about the new program being offered. However, it should be emphasized that all faculty within the entire college should be informed about the new web-based Master's program. Academic advisors, as well as college and university recruiters, should be kept abreast of the latest developments in program offerings within the college. Perhaps a complete marketing plan to include informational handouts, sample course materials, and informational programs to interested stakeholders and clients should be developed for all new programs offered.

It will be important to see, as the web-based Master's degree program is implemented and grows, whether perceptions of faculty, and eventually students, change over time. Is the new program as challenging as similar on-campus degree programs? Should the new program be viewed as an equivalent degree, or is it a different program offered specifically for place-bound off-campus students. And most importantly, how do graduates and employers judge the quality of the web-based Master's degree program in Agronomy?

NAERC '99

Research Fresh from Florida

Anticipating Roles of the Cooperative Extension Service in 2010: A Delphi Technique Involving Agriculture and Natural Resource Agents and Family and Consumer Science Agents in Texas

Glen Shinn and Kyle Smith
Texas A&M University

INTRODUCTION

Clearly, the count-down to a new millennium focuses on anticipating enormous change. Reston (1998) described the eve of the current millennium as one where "...Europeans feared the world would end. The old order was crumbling, and terrifying and confusing new ideas were gaining hold in the populace" (p. 1). Marsh (1999) concluded that some fifty years later "...the world had changed dramatically—Europe has literally been transformed. A new reality and new perspectives framed the Western world" (p. 2).

ERIC

Boyett and Conn (1991) forecasted extensive change in organizations of the 21st Century. "These changes are drastic–even revolutionary–and they will affect every American. If Americans are to survive in the workplace of tomorrow, they need to know what to expect so they can prepare themselves" (p. 2). Hamel and Prahalad (1994) observed that many companies have been working hard to transform their organizations. They concluded that the "key to future industry leadership is to develop an independent point of view about tomorrow's opportunities and build capabilities that exploit them" (back cover). Stone and Bieber (1997) concluded that "linking individual competencies that lead to superior performance to the strategic directions of the organization will help us anticipate the new knowledge, skills and behaviors needed in the future in order to respond to complex problems faced by our clientele" (p. 1).

Extension organization and policy literature is replete with attacks on Extension as an institution and copious advice in advancing program quality, relevance and impact (Buford, Bedeian & Lindner, 1995; Harriman & Daugherty, 1992; Rivera, 1990; Thompson & Gwynn, 1989). Meier (1989) warned that "Extension must change if it's [sic] to keep pace with current trends, achieve national prominence, and regain its pre-eminence in providing responsive educational programs of the highest quality to its publics" (p.1). Warner, Christenson, Dillman and Salant (1996) observed "the past decade and a half have brought major changes to Extension" (p. 1).

With this backdrop of challenge and concern, a statewide Extension committee was charged to examine the roles and competencies for county Extension agents for the year 2010.

PURPOSE AND OBJECTIVES

The purpose of this inquiry was to develop a consensus document that would provide a perspective of roles of the county Extension agent and the competencies that are needed to insure future success. The specific objectives of this inquiry were to:

1. Define the critical roles of the county Extension agent in the year 2010 and the transition that will occur in those roles over the next 12 years.
2. Identify those competencies that individuals must have to effectively serve the public in 2010.
3. Identify rewards that encourage county Extension agents to acquire core competencies.
4. Identify the barriers that discourage county Extension agents from acquiring core competencies.

RATIONALE

It was recognized that three assumptions underpin this inquiry: (1) knowledge is expanding at significant rates, (2) county Extension agents are knowledge workers, and (3) county Extension agents are socially and politically appropriate change leaders in agriculture, natural resources, family organizations, and consumer groups.

METHODS AND PROCEDURES

As a futuring activity, the Delphi Technique was congruent with the purpose and objectives of the study. Helmer (1967) described the Delphi Technique as a method of eliciting and refining group opinions. The procedure is based on iterative and controlled feedback interactions among a jury of identified experts who remain anonymous to each other. The inquiry was conducted in four phases, with each phase moving closer to satisfying the four objectives of the study.

Phase I. (Pre-Data Collection) Two separate juries of 15 county Extension agents, one in agriculture and natural resource programs (ANR) and one in family and consumer science programs (FCS), were identified. Jury members were selected who were in mid-career and were highly successful in their local Extension program and in personal development. An individually prepared letter invited their expert opinion regarding the dimensions of the inquiry. A self-addressed, business reply envelope was included with the letter along with the option to return the instrument by facsimile. This phase initiated a separate, sustained three-round dialogue among the two sets of jury members.

The Rand Corporation found process reliability to be a function of group size (Dalkey, 1969). When the number of participants per group was greater than 13, questions of process reliability were satisfactorily answered. Dalkey determined that mean correlations were greater than 0.80 in such groups.

Phase II. (Rating the Opinions) The Round 1 instrument was mailed to each jury as a personalized letter describing the purpose of the inquiry and soliciting participation. A critical role was defined as an expected behavior pattern usually determined by an individual's status in a particular society. A core competency was depicted as a skill, knowledge, motive, attitude, or characteristic that causes or predicts outstanding performance. Rewards were experiences that encourage the acquisition of core competencies while barriers impede the acquisition. Round 1 statements from each independent jury were converged and incorporated into the Round 2 instrument. Round 2 asked each jury to describe their strength of agreement on each statement using a six-point Likert-type scale. An *a priori* decision was made to retain all statements on which two-thirds or more of the jury agreed at levels 5 or 6 (agree–strongly agree). A self-addressed, business reply envelope was included. Summary statistics were calculated for each statement.

Phase III. (Developing Consensus) Frequency distributions were used to identify and refine the Round 2 responses. Round 3 instruments were personalized and mailed with a self-addressed business reply envelope. Each jury member was instructed to re-evaluate each statement based on information that included his/her ratings in comparison with the group ratings for each item.

Phase IV. (Analysis of Data) Each statement was analyzed from the Round 3 responses using summary statistics selected to describe consensus. Frequencies were again used to select responses based on a two-thirds majority. For brevity in this report, the four sets of statements from each group of experts were subjected to an unstructured *Q*-sorting procedure. Kerlinger (1986) described an unstructured *Q*–sort as "a set of items assembled without specific regard to the variables or factors underlying the items (p. 511). Kerlinger recommended that "a large number of statements are taken from various statement sources and put together in a Q–sort. The items of an

unstructured Q–sort are like the items of a personality or attitude scale: they are selected and used because they presumably measure one broad variable..." (pp. 511-512). Findings were used to develop a consensus document that can provide focus and direction to identify the roles, competencies, rewards, and barriers for county Extension agents.

An invitation was extended to 30 jury members who constituted a frame of experts. This resulted in an open dialogue among 15 ANR county Extension agents and 15 FCS county Extension agents. Round 1 statements were converged and incorporated into the Round 2 instrument for both expert groups. Original language of the experts was retained without attempts to clarify or interpret meaning. Round 2 was mailed to each jury asking them to respond using a six-point Likert-type scale describing their strength of agreement to each statement. Summary statistics were calculated for each statement. Table 1 describes the expert jury, timelines, and statements retained in each round.

Table 1

A Description of the Expert Jury, Time Lines, And Statements Retained in Each Round of Delphi Technique on Roles of Cooperative Extension Agents in 2010.

	Frame	R1	R2	R3	R4
Source of expert jury					
ANR	15	15	14	15	
FCS	15	15	15	15	
Composite jury	30	30	29	30	
Date mailed-ANR		01 Feb	12 Mar	12 Apr	
Return date requested-ANR		23 Feb	26 Mar	21 Apr	
Number of statements retained-ANR					
Roles			31	29	24
Competencies			32	32	32
Rewards			20	18	15
Barriers			22	11	11
Date mailed-FCS		12 Mar	12 Apr	07 May	
Return date requested-FCS		26 Mar	21 Apr	28 May	
Number of statements retained-FCS					
Roles			39	34	34
Competencies			50	47	44
Rewards			37	34	30
Barriers			32	21	16

FINDINGS

Roles of the ANR and FCS county Extension agent in the year 2010

A role was defined as "an expected behavior pattern usually determined by an individual's status in a particular society." Thirty-one role statements were collected from 15 ANR experts as a result of Round 1. Consensus among two-thirds of the jury was achieved for 24 statements after Round 3. Using an unstructured *Q*–sorting procedure, the jury recommended that the role of the county Extension agent should delineate six broad dimensions: (1) serving as an educator, facilitator and community leader, (2) providing unbiased information and technical assistance to clientele, (3) acting as an advocate of early adoption of innovation and technology, (4) being an active member of the community, (5) adapting to changing community needs, (6) demonstrating and evaluating technologies for local adaptation.

FCS experts originated 39 statements describing the critical roles of the successful county Extension agent-FCS in 2010. Following the third round, 34 roles met the *a priori* test of consensus. Using an unstructured *Q*–sorting procedure, these roles were clustered into eight principal dimensions: (1) serving as an educator, facilitator, consultant and community leader, (2) providing unbiased information and technical assistance to clientele–especially to families and youth, (3) being an advocate of early adoption of innovation and technology, (4) being an active member of the community, (5) adopting to changing constituency needs, (6) demonstrating and evaluating technologies and processes for local adaptation. (7) collaborating with other organizations, and (8) involving minority groups in programming. These findings are somewhat analogous to those of Seevers (1999) who examined organizational values of the New Mexico Cooperative Extension Service. Seevers identified 14 organizational values that included values such as "honesty/integrity in our work" and "people-centered programs" (p. 134).

A composite list of the roles and the number of role statements of ANR and FCS county Extension agents resulting after Round 3 is included as Figure 1 and Figure 2.

The roles of the successful ANR county Extension agent include:

- serving an educator, facilitator and community leader (8 statements).
- providing unbiased information and technical assistance to clientele (4 statements).
- acting as an advocate of early adoption of innovation and technology (4 statements).
- being an active member of the community (3 statements).
- adopting to changing community needs (3 statements).
- demonstrating and evaluating technologies for local adaptation (2 statements).

Figure 1. Roles of the ANR county Extension agent for the year 2010.

The roles of the successful FCS county Extension agent include:

- serving as an educator, facilitator, consultant and community leader (12 statements).
- providing unbiased information and technical assistance to clientele–especially to families and youth (6 statements).
- acting as an advocate of early adoption of innovation and technology (5 statements).
- being an active member of community (2 statements).
- adopting to changing constituency needs (1 statement).
- demonstrating and evaluating technologies and processes for local adaptation (3 statements).
- acting as a collaborator with other organizations (4 statements).
- involving minority groups in programming (1 statement).

Figure 2. Critical Roles of the FCS county Extension agent for the year 2010.

Competencies of the ANR and FCS County Extension Agent in the year 2010

Round 1 resulted in 32 statements describing core competencies of the successful ANR county Extension agent in 2010. A core competency was defined as "a skill, knowledge, motive, attitude, or characteristic that causes or predicts outstanding performance." All 32 statements survived the test of consensus through Round 3. FCS county Extension agents identified fifty core competencies in Round 1. Forty-four core competencies remained through the third round of FCS consensus. Using an unstructured *Q*–sorting procedure, these competencies were clustered around seven constructs: (1) personal effectiveness, (2) developing others, (3) involving others, (4) demonstrating a bias toward action, (5) communications, (6) subject matter expertise, and (7) organizational effectiveness.

These findings are somewhat inconsistent with the findings of Cooper and Graham (1999), who identified competency areas in program planning, public relations, personal and professional development, faculty and staff relations, personal skills, management responsibilities, and work habits (p. 10). These findings are also somewhat inconsistent with the findings of Radhakrishna (1998), who identified the need for inservice training in program evaluation and accountability and research methods (p. 80).

Consensus statements that describe desirable core competencies for ANR and FCS county Extension agents are included as Figure 3.

The core competencies are:	Number of Statements Describing Core Competencies ANR	FCS
❑ personal effectiveness	5	8
❑ developing others	6	4
❑ involving others	4	11
❑ demonstrating a bias toward action	4	8
❑ communications	1	2
❑ subject matter expertise	11	6
❑ organizational effectiveness	1	5
Total	32	44

Figure 3. Core competencies of the ANR and FCS county Extension agent for the year 2010.

Rewards that encourage ANR and FCS county Extension agents to acquire core competencies

The 15 experts in the ANR jury identified 20 rewards in the first round of the query. Fifteen rewards remained through Round 3. The 15 experts in the FCS jury identified 39 rewards in the first round of the query. Thirty rewards remained through Round 3. Using an unstructured *Q*–sorting procedure, six broad reward constructs emerged: (1) personal satisfaction, (2) professional respect from clientele, (3) peer recognition, (4) salary and promotion based on performance, (5) program flexibility based on professional judgement, (6) financial compensation for professional development.

These findings are somewhat compatible with the findings of Mwangi and McCaslin (1995), who examined motivation of Extension agents in Kenya. They identified 35 job satisfaction items and six factors that included (1) evaluation, (2) dependable supervisors, (3) work incentives, (4) pay, (5) praise & work location, (6) housing & transportation, (7) job security, and (8) administration and supervision (pp. 18-19).

The rewards are:	Number of Statements Describing Rewards ANR	FCS
❑ personal satisfaction	3	3
❑ professional respect from clientele	2	3
❑ peer and administrative recognition	1	7
❑ salary and promotion based on performance	4	6
❑ program flexibility based on professional judgement	2	4
❑ financial compensation for professional development	3	5
❑ balance time for family & community	0	2
Total	15	30

Figure 4. Rewards that encourage ANR and FCS county Extension agent from acquiring core competencies.

Barriers that discourage ANR and FCS county Extension agents from acquiring core competencies

In the first round of the query, the ANR jury identified 22 barriers that discourage the acquisition of core competencies. Eleven barriers met the test of consensus through Round 3. In the first round of the query, the FCS jury identified 32 barriers that discourage the acquisition of core competencies. Sixteen barriers met the test of consensus through Round 3. Using an unstructured *Q*–sorting procedure, five broad categories of barriers emerged: (1) time pressure and increased workloads, (2) personal costs associated with acquisition, (3) increasing scope of job responsibilities resulting from training, (4) lack of local funds, (5) lack of financial reward.

The barriers are:	Number of Statements Describing Barriers	
	ANR	FCS
❑ time pressure and increased workloads	4	10
❑ personal costs associated with acquisition	1	0
❑ increasing scope of job responsibilities resulting from training	1	2
❑ lack of local funds	2	0
❑ lack of financial reward	3	3
❑ limitation of promotional opportunities	0	1
Total	11	16

Figure 5. Barriers that discourage ANR and FCS county Extension agent from acquiring core competencies.

CONCLUSIONS

Drucker (1999) predicted with bold certainty that "we face long years of profound changes" (p. 92). Critics have "...challenged Extension Services to take a close look at their missions, organizational structure, management, and programs" (Buford, Bedeian & Linder, 1995, p. 313). Lick challenged the Extension organization to develop a mindset of potential rather than survival, leadership rather than management, and doing the right programs rather than doing programs right (Buford, Bedeian & Linder, 1995). Pritchett (1999) bluntly concluded that "today's world takes no pity on the person who gets lazy about learning. Either you take personal responsibility for continuing your education, or you end up without the knowledge you need to protect your career" (p. 22).

In an effort to create their preferred future, an expert jury of ANR and FCS county Extension agents viewed their roles as educators and community leaders who provide information and technical assistance to a broadening clientele base. Drucker (1995) might call them knowledge workers. The expert jury encouraged acting as an informed advocate and adopting to changing community needs. Borlaug (1998) might call them integrators. The jury viewed themselves as active in the community and demonstrating technologies for local adoption. They might call themselves educators and change leaders.

In order to be successful in these 21st Century roles, the expert jury focused on core competencies that transfer subject matter expertise through effective communications. Personal effectiveness is juxtaposed with involving and developing others. Organizational effectiveness and

ERIC Full Text Provided by ERIC

a bias toward action enhance these functional competencies.

Rewards and barriers govern the rate of acquisition of these core competencies. Wheatley (1994) observed that "our attention is shifting from the enticement of external rewards to intrinsic motivators that spring from the work itself" (p. 12). The expert jury recognized the value of personal satisfaction, peer recognition, and professional respect. They also were keenly aware of salary and promotion as rewards. The acquisition of core competencies will accelerate with the reduction of job stress, escalating responsibilities, and financial disincentives. The jury recognized that effective programs must be flexible and meet the changing needs of the public.

RECOMMENDATIONS

If the Texas Agricultural Extension Service is to maintain its legacy in advancing quality programs, providing informal public education, and facilitating solutions for complex economic, biological and social problems, then it is critical that Extension administration and county Extension agents recognize and accept the roles and competencies which will best serve the public in 2010. An organizational commitment must be clearly communicated to influence the following areas.

1. Undergraduate degree programs must be encouraged to align with the core competencies identified for future successful county Extension agents.
2. Human resource personnel must recruit and employ individuals who possess core competencies that will enhance mission success.
3. An organizational climate must be maintained that rewards sustained professional development.
4. The balance of personal and professional roles and expectations must be recognized.
5. Authentic recognition and rewards must be provided for those who are actively engaged in self-directed professional development.

This transformation will require a call for action that requires professional development, increases access to education and training, recognizes diversity and values professional judgement, and invokes intrinsic and extrinsic motivational strategies. However, Drucker (1999) warned that knowledge workers are responsible for their own contributions, that continuous innovations must be built into every job, and that continuous learning and continuous teaching are essential for success. The diligent participation and the consensus of the expert jury are evidence that mid-career county Extension agents are ready to adapt to the anticipated changes of the 21st Century.

ERIC Full Text Provided by ERIC

REFERENCES

Borlaug, N. E. (personal communications, October 19, 1998)

Boyett, J. H. & Conn, H. P. (1991) . Workplace 2000: the revolution reshaping American business. New York: Penguin Group / Dutton.

Buford, J. A., Bedeian, A. G. and Linder, J. R. (1995) . Management in Extension. Columbus OH: Ohio State University Extension.

Cooper, A. W. and Graham, D. L. (1999, January) . Competencies needed to be a successful county Extension agent. Paper presented at the 49th AAAE Southern Agricultural Education Research Meeting, Memphis, TN.

Dalkey, N. C. (1969) . The Delphi method: An experimental study of group opinion. Santa Monica, CA: The Rand Corporation.

Drucker, P. F. (1995) . Managing in a time of great change. New York: Truman Talley Books / Dutton.

Drucker, P. F. (1999) . Management challenges for the 21st century. New York: HarperCollins Publishers, Inc.

Hamel, G. & Prahalad, C. K. (1994). Competing for the future. Boston: Harvard Business School Press.

Harriman, L. C. and Daugherty, R. A. (1992). Staffing Extension for the 21st century. Journal of Extension. 28 (3): 1 – 6.

Helmer, O. (1967). Analysis of the future: The Delphi method. Santa Monica, CA: The Rand Corporation.

Kerlinger, F. N. (1986) . Foundations of behavioral research. Fort Worth: Hold, Rinehart and Winston, Inc.

Marsh, D. D. (1999) . Introduction: an opportunity that comes once in a millennium. In Marsh, D. D. (Ed.), ASCD YearBook: Preparing our schools for the 21st century. (pp. 1-9) . Alexandria, VA: Association for Supervision and Curriculum Development.

Meier, H. A. (1989). Extension trends and directions. Journal of Extension. 27 (3): 1 – 5.

Mwangi, J. G. & McCaslin, N. L. (1995). Factors related to the motivation of Extension agents in Kenya's Rift Valley Province. Journal of International Agricultural and Extension Education. 2 (1): 16 – 25.

National Association of State Universities and Land-Grant Colleges. (1995) . The land-grant tradition: Smith-Lever Act of 1914, as amended. Washington, D.C.: Author.

Pritchett, P. (1999). The employee handbook of new work habits for a radically changing world. Dallas: Pritchett & Associates.

Radhakrishna, R. B. (1998, December). Program evaluation and accountability needs of extension professionals. Paper presented at the 25th National Agricultural Education Research Meeting, New Orleans, LA.

Reston, J. (1998). The last apocalypse: Europe at the year 1000. New York: Doubleday.

Rivera, W. M. (1990). "Future of Extension worldwide." The Journal of Extension. 28 (3) 1-5.

Seevers, B. S. (1999, April). Organizational values of New Mexico Cooperative Extension Service employees. Paper presented at the Western Region Agricultural Education Research Meeting, Corpus Christi, TX.

Stone, B. V. (1997). "A system's approach to professional development." The Journal of Extension. 35 (3) 1-4.

Stone, B. V. and Bieber, S. (1997). "Competencies: A new language for our work." The Journal of Extension. 35 (1) 1-4.

Thompson, O. E. and Gwynn, D. (1989). Improving Extension: views from agricultural deans. Journal of Extension. 27 (1): 1–7.

Warner, P. D., Christenson, J. A., Dillman, D. A., and Salant, P. (1996). Public perception of Extension. Journal of Extension. 34 (4): 1–7.

Wheatley, M. J. (1994). Leadership and the new science: Learning about organizations from an orderly universe. San Francisco: Berrett-Koehler Publishers, Inc.

ANTICIPATING ROLES OF THE COOPERATIVE EXTENSION SERVICE IN 2010: A DELPHI TECHNIQUE INVOLVING AGRICULTURE AND NATURAL RESOURCE AGENTS AND FAMILY AND CONSUMER SCIENCE AGENTS IN TEXAS

A Critique

Susan Fritz
University of Nebraska

This study employed the Delphi and Q-sort techniques to identify roles, competencies and rewards and barriers of Texas Agricultural Extension Service agents in 2010. Although brief, the theoretical framework presented by the researchers established an adequate background and rationale for the study that drew upon literature from several disciplines as well as Extension research.

The explanation of the uses of the Delphi and unstructured Q-sort techniques is clear, and leads the reader easily through the process. Key to the use of the Delphi technique is the selection of the "jury" in Phase I. The researchers report the "jury members were selected who were in mid-career and were highly successful in their local Extension program and in personal development." Clarification is needed regarding the definitions of "mid-career," "highly successful," and "personal development" and information about those who made these designations.

Throughout the Findings section the researchers deftly report results and link them to the study objectives and related research. It is interesting to note that the purpose and objectives of the study focus on county Extension agents, and do not make a distinction between Agriculture and Natural Resources agents, and Family and Consumer Science agents. However, the structure of the study establishes the distinction. Why was this necessary? Why could the researchers not employ the assistance of one jury comprised of agents from each area?

The researchers are to be commended for resisting the temptation to collapse the Conclusions and Recommendations sections into one. Collapsing these two sections oftentimes diminishes the quality of both, shortchanging research inference and application. The call for organizational commitment to influence the five areas identified (undergraduate degree programs, recruitment, organizational climate, balance of roles, and authentic recognition and rewards) is a tall order. However, the researchers rightly remind us that it is the responsibility of all employees of organizations, Agents and administrators alike, to make these changes happen.

The final statement of the manuscript implies that the participation of the jury members was an indicator that agents are ready to adapt to changes of the 21st century. This statement seems to be a broad generalization and perhaps even conjecture. Participation in this process as presented to potential jury members could have had more to do with a perceived relationship to their position responsibilities than to their ability to adapt to rapid changes.

The Delphi technique is frequently used to obtain group opinions, and is especially effective for needs assessments like this study. However, the technique has also been criticized by some (Woudenberg, 1991). Because the technique reaches consensus among a group, it is

ERIC Full Text Provided by ERIC

believed that the consensus is achieved more likely due to group pressure than finding "true" expert opinion. After completing this study, I am interested in the researchers' reaction to this criticism.

Woudenberg, F. (1991). An evaluation of Delphi. *Technological Forecasting and Social Change, 40*, 131-150.

ERIC Full Text Provided by ERIC

Knowledge, Attitudes, and Perceptions of Journalists for Newspapers in Metropolitan Markets in the United States Regarding Food Biotechnology


Tom Vestal
Texas A&M University


Gary Briers
Texas A&M University

INTRODUCTION AND THEORETICAL FRAMEWORK

Naisbitt (1990) asserted that those who develop "high tech" must maintain "high touch" with the end users of the technology. Agriculture is perceived as slow paced and sustaining. The public may not know the rapid rate of change that biotechnology, specifically food biotechnology, has brought to agriculture. The US Food and Drug Administration, Department of Agriculture, and Environmental Protection Agency approved the first genetically modified seed for commercial row crop production in 1996. Dispersed throughout approximately 400 million US crop acres, genetically modified seed were planted by farmers on 5 million, 30 million and 60 million acres during 1996, 1997 and 1998 respectively (NABC, 1998). Successful diffusion of innovations of agricultural biotechnology may some day be documented as "unprecedented" in diffusion of agricultural innovations. A major concern (Naisbitt, 1990), is meaningful dialog, in lay terms, with the end users (consumers) of high technology (e.g., biotechnology).

ERIC

Most agricultural innovations are diffused among the farmers; thus, there is little effort to educate or influence consumers. Food biotechnology differs though, because these technologies are perceived to have a direct effect on the food we eat. This direct effect launches food biotechnology into a public discourse, a discourse that is played out in the media. The International Food Information Council (1997) reminds us that mass media play an important role and serve as gate-keepers of food and health information. These gate-keepers control many of the written and oral messages by which consumers base their perceptions, attitudes, and behavior.

Hallman (1995) asked consumers about the term "genetic engineering." More than 20 percent of the consumers responded negatively: "frightened," "escaping virus," "Nazi/Hitler," "mutants" and "mad scientist." Four percent mentioned "medical advances," "better food" or "progress;" one-fourth responded neutrally: 'DNA," "plants," or "people." Fifty-two percent of respondents in a national survey by the Office of Technology Assessment (OTA, 1987) replied that genetically engineered products were likely or very likely to present a serious danger. The experts agree that one's attitudes are influenced by one's beliefs. The question not yet answered is the following: What is it that gives origin to beliefs and attitudes? Some say both beliefs and attitudes are derived from another rather abstract concept, perception. Elias and Merriam (1995), Schoell and Guiltinan (1995) and Koch (1963) form general consensus that perceptions determine a person's attitudes, beliefs, values and ostensive behavior.

Schoell and Guiltinan (1995) wrote "perception is the process through which an individual selects relevant stimuli (information) from the environment, organizes them, and assigns meaning to them" (p. 145). They continued that individuals, organizations, governments, corporations and other institutions attempt to expose people to numerous information or marketing stimuli simultaneously. What is important to note is that we are selective and pay attention to only that information or marketing stimuli which interests us at any given moment. Schoell and Guiltinan (1995) and Rogers (1995) refer to this selective tendency, influenced by a person's standing attitudes and beliefs as selective perception. They agree that selective perception gives rise to one's behavior.

Reality, according to Elias and Merrian (1995), is based on perception. That is, reality is not always what actually is; it is essentially what one believes exists. They propose that people may develop conflicting or different perceptions when exposed to the same stimuli. Studies by Sanbonmatsu and Fazio (1990) and Fazio, Powell, and Williams (1989) have shown that perceptions are often based on already present global attitudes toward similar topics or technologies when knowledge about the subject is low. They continue that attitudes based on global judgements equate more unpredictable behavior than attitudes based on personal experiences.

Science for many, journalists included, is a complex discipline. Wood (1994) suggested that rational responses are often absent when the science is about one's food, health, or environment. So, he recommended that agriculturists go beyond the physical sciences and delve into social and behavioral sciences to address issues that influence affective behavior (values, morals, beliefs) and emotional response in addition to cognitive behavior (rational), that which can be reduced to empirical factual knowledge. Mazur's (1981) study of biotechnology found that, although few consumers disapprove of biotechnology, media coverage that gave the appearance of a dispute benefited the opponents of the technology. This points toward the need to enhance the methods agricultural educators use to inform the public through mass media.

ERIC Full Text Provided by ERIC

The most important factor in consumer understanding of science and technology is mass media (Terry, 1994). To learn how journalists and scientists felt about one another, Chappell and Hart (1998) sampled 2000 journalists and 2000 scientists. They found that neither group believed it was doing a good job of explaining science to the public. They concluded that those transferring scientific information to the public should engage in a systematic, continuing education activity exposing them to scientists and research processes. Rogers (1983) reiterated that mass media are the primary source to increase people's awareness about agriculture. He continued that mass media have great influence upon public perception, influence that he calls the Hypodermic Needle Model which causes "direct, immediate and powerful effects" (p. 272) by figuratively injecting information into society. Therefore, to improve the methods agricultural educators use to inform the public through mass media, the researchers wanted to know: What knowledge about, attitudes toward, and perceptions of food biotechnology metropolitan journalists' hold?

RESEARCH OBJECTIVES

The purposes of this study were to determine the knowledge of and attitudes/perceptions of journalists toward food biotechnology. The research objectives were to: a) investigate and determine the knowledge, attitudes and perceptions held by metropolitan journalists regarding food biotechnology, and b) investigate relationships between knowledge and attitudes/perceptions regarding food biotechnology, and selected personal and situational characteristics of journalists.

METHODS/PROCEDURES

The target population was metropolitan journalists at 96 of the nation's largest newspapers according to daily circulation (Levins, 1997). They had a cumulative daily circulation of 30 million readers. A census of 376 journalists representing the "beats" of business, environment, agribusiness, features, food, health/medical, and science/technology was administered. These beats were selected because the benefits and risks associated with biotechnology cross a variety of disciplines; therefore, public discourse in the news may be framed in many contexts (Duhe', 1993; Peterson, 1996).

The design was correlational/descriptive. The researchers developed a 63-item instrument based on related research by Duhe' (1993), Barton (1992), and *North Carolina Nationwide Survey on Biotechnology* (as cited in Duhe', 1993). The instrument measured knowledge, attitudes, and perceptions. These three constructs were quantified in nine specific scales to determine (a) knowledge, (b) acceptance of genetically modified organisms, (c) acceptance of specific food biotech practices, (d) attitudes toward effects of biotechnology, (e) the level of importance placed on food biotechnology research, (f) faith in sources of food biotechnology information, (g) the level of importance placed on investigative reporting style when the subject is about food biotechnology, (h) attitudes toward potential obstacles to acceptance of food biotechnology, and (i) perceptions regarding producer adoption and consumer acceptance food biotechnology on the farm.

Knowledge was measured using multiple choice items. Attitudes and perceptions were measured from responses on Likert-type scales. Content validity was determined by twelve scientists from journalism, horticulture, agricultural education, agronomy, entomology and biochemistry at Texas A&M University and Texas Tech Universities. A pilot study of journalists at 50 similar newspapers established instrument face validity and reliability of the scales.

Data collection involved seven contacts with these journalists: (a) an introductory letter, (b) the original questionnaire and cover letter, (c) a postcard reminder following the questionnaire, (d) follow-up telephone calls made randomly to one-third (n = 115) of the non-respondents, (e) a second questionnaire and cover letter, (f) a postcard reminder following the second questionnaire, and (g) telephone calls made randomly to 50% (n = 169) of the non-respondents.

Questionnaires received during a 3-month data collection period ending April 30, 1998 served as the data source for this study. Because date of response was not correlated with the attitude/perception scales and because date of response and knowledge yielded a statistically significant but "low" (Davis, 1971) correlation (r = .21, p=.046), the researchers, considering the exploratory nature of this study, made inferences to the target population to establish baseline information. Data were analyzed with SPSS® (SPSS, Inc., 1998).

RESULTS/FINDINGS

Research instruments were returned by 65% (n = 62) of the newspaper organizations representing professionals from metropolitan areas throughout the United States. Complete and usable instruments were returned by 88 (23%) journalists.

Half of the journalists identified their primary responsibility as "Editor" and half identified themselves as a "Writer." Fifty-seven percent (n = 50) of the responses were from female journalists; 43% (n = 38) were from males. Ninety-five percent (n = 83) of the respondents had attained Bachelor's degrees; of these, 15.9% (n = 14) held Master's degrees, and 2.3% (n = 2) held doctorates. Forty-two of the responding journalists had practiced professional journalism for more than 20 years. The median number of years of professional experience was 19.7 years.

Twenty percent (n = 18) said their families owned agricultural property while 23% (n = 20) indicated they had lived on a farm or ranch. Eighty-three percent (n = 72) indicated they had read or studied about biotechnology in the previous six weeks. Ninety-two percent (n = 81) indicated they were "aware" or "somewhat aware" of how biotechnology will affect their food, health, and environment. Thirty-nine percent (n = 34) had contributed to articles on biotechnology. Only nine percent (n = 8) were agribusiness (e.g., farm) journalists while 91% (n = 80) of the respondents covered other beats (Business, 17%; Environment, 10%; Food, 30%; Features, 12%; Health/Medicine, 14%; and Science/Technology, 8%). Journalists covering food beats had a higher rate of response than anticipated.

FINDINGS RELATED TO RESEARCH OBJECTIVE ONE

Nine items reviewed by an expert panel were used to measure journalists' knowledge about food biotechnology. Two examples of questions in the knowledge scale are as follows:

Season-long insect control using Bt will expose two to three generations of insects to the toxin and will...(√ marks correct answer)

1 speed up the development of insect resistant plants.
2 slow the development of insect resistant plants.
3 slow the development of Bt resistant insects.
4 speed up the development of Bt resistant insects. √

The FDA recommends to reject or approve new foods produced through biotechnology...(√ marks correct answer)

1 with more stringent controls and qualifications than other foods.
2 by determining if the new food is equivalent to those already available to consumers. √
3 by requiring higher standards for nutritional values than other foods.
4 by requiring higher concentrations of essential vitamins and minerals than other foods.

The reliability of this scale was .67. Scores revealed a lack of knowledge about food biotechnology with a sample mean of 30% correct answers. One would expect an average of 25% on a multiple-choice test with four choices with no knowledge of the subject matter. Their low level of knowledge was similar to knowledge levels of consumers (Bruhn, 1997). Interestingly, almost 75 percent of the respondents indicated that their level of scientific knowledge was "average," "somewhat high," or "high." Thus, their perceived level of knowledge was higher (at least in a qualitative sense) than their assessed level of knowledge.

The instrument contained 40 items designed to assess journalists' attitudes or perceptions regarding food biotechnology. Reliability of the eight attitudinal/perception scales ranged from .72 to .92. The first scale involved journalists' acceptance of genetic modification of organisms (GMOs). Journalists believed genetic modification of humans to be the least acceptable use of biotechnology (Table 1). Genetic modification of animals followed with nearly 41% (*n*=33) selecting "highly unacceptable" or "somewhat unacceptable." Journalists generally accepted genetic modification of forest/landscape plants, food crops, and microorganisms.

Next, journalists indicated their levels of acceptance of four specific food biotechnology practices. A large majority (81%-91%) of the journalists considered biotechniques to create insect resistant corn and cotton, slow vine-ripened tomatoes, and develop herbicide resistant soybeans as "highly" or "somewhat acceptable."

A third scale measured their beliefs regarding effects of biotechnology on world hunger, healthful foods, family farms, and fish and wildlife. Generally, journalists were ambivalent about the effects of food biotechnology on healthful foods, fish and wildlife, and family farms. However, they believed that there would be a positive effect of biotechnology on world hunger. This finding tends to support Benedict's (1998) assertion that biotech crops may increase yield per acre.

Table 1. Descriptive Statistics Concerning Journalists' (*N*=88) Acceptance of Genetically Modified Organisms

Question: What is your current level of acceptance of genetic modifications of the following organisms?

(1=Highly unacceptable, 2 = Somewhat unacceptable, 3 = Somewhat acceptable, 4 = Highly acceptable)

	*Frequencies**				
Application	*1*	*2*	*3*	*4*	*Mean*
Forest/Landscape plants	4	9	38	30	3.16
Food Crops	4	9	42	26	3.11
Microorganisms	5	12	41	21	2.99
Animals	15	18	39	9	2.52
Humans	30	26	21	5	2.01

Cronbach's coefficient alpha = .87 Scale mean =2.77

**Frequencies* represent that 92% of the journalists responded.

Journalists were then asked their opinions of the importance of biotechnology research leading to seven possible outcomes. All seven were rated as important. Most highly rated were research to reduce pesticides, to benefit the environment, and to develop safer foods. Less important was research on adding nutritional value to foods. These findings support that of Hoban (1996) who found higher levels of consumer acceptance for agricultural biotechnology that offers relative advantages (e.g., human and environmental health, food quality).

A fifth area of inquiry involved journalists' expressed faith in seven selected sources of information on food biotechnology (see Figure 1). Journalists' revealed most faith in statements about food biotechnology from university scientists (mean = 3.76 on a 5-point scale) and health

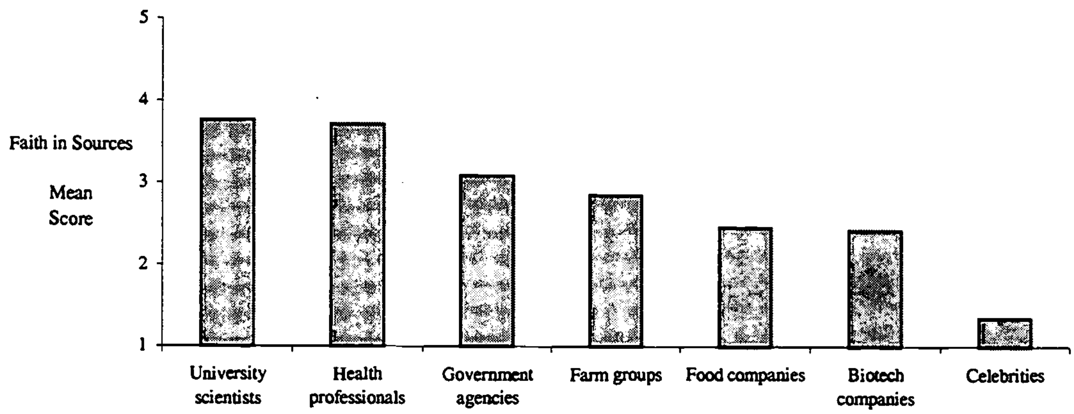


Figure 1: Metropolitan Journalists' (*N*=88) Faith in Sources of Food Biotechnology Information. (1 = Very low; 2 = Low; 3 = Neutral; 4 = High; 5 = Very high)

professionals (mean = 3.71), supporting the research of Hoban and Kendall (1993). Journalists' faith in statements made by government agencies (mean = 3.09) and by farm groups (mean = 2.85) was moderate. They held less faith in statements made by biotech companies and food companies. Journalists indicated least faith in statements made by celebrities.

Journalists responded next to questions about specific journalistic styles (Bare, 1995). They viewed as most important that journalists investigate claims and statements made by biotech companies, food companies, or activist groups, and (to a lesser extent) by university scientists. Too, they believed that journalists should analyze and interpret both undesirable and desirable consequences of food biotechnology. Least important was for journalists to mirror events and avoid interpretation.

Journalists were asked to express the degree to which selected obstacles influence their acceptance of biotechnology in food production. Religious/ethical concerns about "tampering with nature" was rated low as an obstacle to their acceptance (Table 2). On the other hand, fears of genes moving unchecked to other life forms, of food safety consequences, and of environmental harm were moderately high.

Table 2. Descriptive Statistics Concerning Potential Obstacles to Journalists' (*N*=88) Acceptance of Using Food Biotechnology

Question: To what degree do you consider each of the following to be obstacles to your acceptance for using biotechnology in food production?
(1 = Very low, 2 = Low, 3 = Neutral, 4 = High, 5 = Very high)

	*Frequencies**					
Fears/Obstacles	*1*	*2*	*3*	*4*	*5*	*Mean*
Environmental harm	2	12	17	33	20	3.68
Genes moving to other plants	5	9	16	36	19	3.65
Food safety concerns	7	9	21	31	17	3.49
Religious/ethical concerns**	25	18	24	12	6	2.48

Cronbach's coefficient alpha = .86 Scale mean = 3.61

*Frequencies represent that 97% of the journalists responded.

**This item omitted from scale.

Finally, journalists indicated their beliefs concerning rate of acceptance of food biotechnology as a farm practice (see Figure 2). On average, journalists (n = 70) perceived that farmers will accept food biotechnology as a farm practice within 3.1 years while consumer acceptance will take 7.7 years. This finding supports earlier research that about 50% of consumers thought that genetically modified foods were already benefiting them and that 75% anticipated benefits from genetically modified foods within the next five years (IFIC, 1997).

ERIC Full Text Provided by ERIC

FINDINGS RELATED TO RESEARCH OBJECTIVE TWO

Knowledge was related to journalists reported awareness of biotechnology's effect on food, heath, and the environment. A correlation coefficient of 22 ($p<.05$) indicated that as journalists' awareness of biotechnology's effect increased, assessed knowledge also increased. Too, as their knowledge increased, journalists believed that it was less important that they use an investigative reporting style ($r=-.27$, $p<.05$). None of the personal/background characteristics of journalists were related to knowledge.

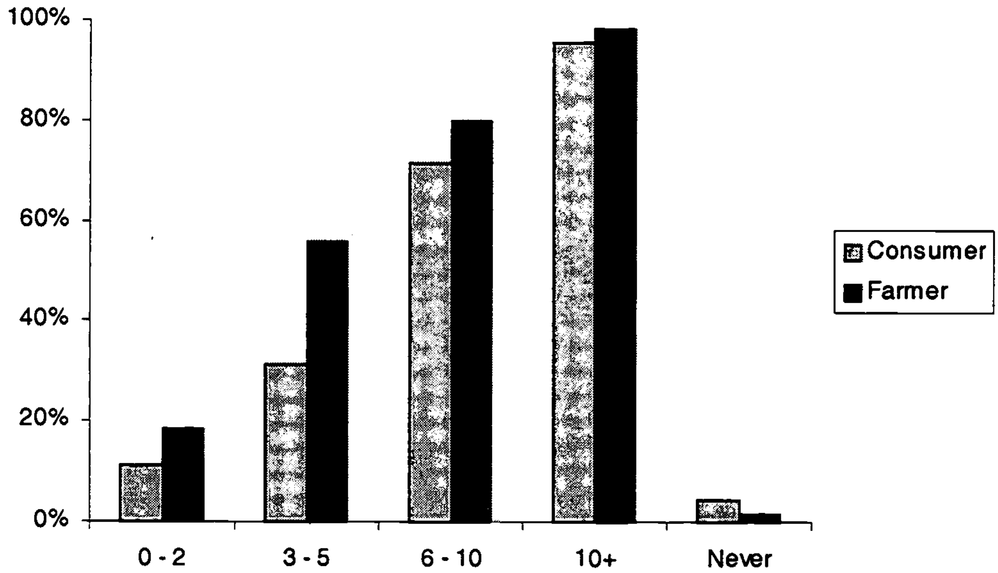


Figure 2: Journalists' (N=88) Cumulative Rate of Acceptance of Food Biotechnology as a Farm Practice.

Journalists' acceptance of genetically modified organisms was related to four other variables. First the researchers found job responsibilities related to acceptance, hence, "writers" rather than editors had greater levels of acceptance ($r_{pbis}=.40$, $p<.01$). Journalists who had contributed to an article on biotechnology ($r_{pbis}=.29$, $p<.05$) and those journalists who perceived they had higher levels of scientific knowledge ($r=.33$, $p<.05$) had greater acceptance levels of genetically modified organisms. Finally, journalists who perceived a more rapid rate of acceptance of food biotechnology as a farm practice among consumers and farmers had greater acceptance levels of genetically modified organisms ($r=-42$, $p<.01$).

No relationships were found between journalists' level of acceptance of biotech practices (e.g., insect resistant corn or cotton, slow vine-ripened tomatoes, herbicide resistant soybeans) and personal or situational variables or other attitudes or perceptions. There were two statistically significant relationships between journalists' beliefs concerning the effects of biotechnology and other variables: Those whose families owned agricultural property tended to believe biotechnology would have more positive effects on fish and wildlife, world hunger, family farms, and healthful

ERIC

foods (r_{pbis}=.24, p<.05). Also, as journalists' perceived level of scientific knowledge increased, they were more likely to consider biotechnology to have a positive effect (r=.25, p<.05). Fowler's, et al (1979) research is supported by this finding. They concluded that most journalists do not have experience by which to reference happenings in agriculture.

There were no relationships discovered between journalists' ratings of the importance of food biotechnology research and any other variables. However, there were two statistically significant relationships between journalists' expressed faith in sources of food biotechnology information and background variables: Their level of faith was related to their primary responsibility at the news organization (r_{pbis}=.27, p<.05).

Journalists' faith in sources was higher among writers than editors. This finding follows the work of Schudson (1995) who discovered that the social interaction between writer and sources builds confidence in the exchange. Also, journalists' level of faith in sources was greater if they had lived on a farm or ranch (r_{pbis}=.23, p<.05). This finding supports marketing research by Schoell and Guiltinan (1995) who found that consumers' wants, motives, perceptions, attitudes, knowledge, personality, and lifestyles are influenced by family, friends, class, and the culture in which they live.

Next, journalists' rating of the importance of an investigative journalistic style was related to whether or not they were raised on a farm or ranch (r_{pbis}=.26, p<.05), to their expressed awareness of biotechnology's effects on food, health, and the environment (r=-.24, p<.05), and to their recency of study/reading about biotechnology (r=-.25, p<.05). Finally, the degree to which journalists perceived various obstacles to acceptance of biotechnology was related to their level of awareness of biotechnology's effects (r=-.19, p<.05) and their primary responsibility in the news organization (r_{pbis}=.32, p<.01).

The greater the journalists' awareness of food biotechnology's effect on food, health, and the environment, the lower the strength of specific obstacles to acceptance of food biotechnology as a farm practice. These findings support work by Bruhn (1997) who concluded that lack of awareness of agricultural practices and little knowledge about biotechnology drove people to oppose products of biotechnology.

CONCLUSIONS/RECOMMENDATION/IMPLICATIONS

Assessing the knowledge, attitudes, and perceptions of metropolitan journalists may enhance the technology transfer and consumer awareness efforts of agricultural educators. Educators must embrace consumers as well as producers in the new agricultural innovation diffusion equation.

Journalists considered fears related to genes moving unchecked to other organisms, food safety consequences, and environmental harm as obstacles to their acceptance of using food biotechnology. There is skepticism because industry and government have endorsed technologies without open public dialog regarding the research (Lewis, 1990). If their knowledge of the technology is so low, then upon what are their perceptions based? They are clearly <u>not</u> based on a thorough knowledge of the technology; thus, they may be influenced by other experiences with science and technology: Alar scare, BST in milk, the clone "Dolly." May (1969) suggests that

consumers' base their perceptions on past experience and knowledge; therefore, if a person has limited knowledge and experience about a topic, then he or she cannot accurately perceive it. Sanbonmatsu and Fazio (1990) have shown that perceptions are often based on already present global attitudes toward similar topics or technologies when knowledge about the topic or technology is low. They continue that attitudes based on global judgements led to more unexpected behavior than attitudes based on personal experiences.

Real or not, the perceptions consumers hold about the safety of biotech foods are likely to sway regulatory decisions, affect research and development, and ultimately delay the diffusion of innovations (Armstrong, 1991). Journalists confessed that they do not have or desire "walking around knowledge" about biotechnology. Thus, they request easy and rapid access to information. Because journalists play a significant role in public education and influence state and national legislative policy, but do not have experiences by which to reference happenings in agriculture and food production, biotechnology education targeting journalists is important.

The attitudes of journalists were more positive toward plant biotechnology than animal biotechnology; so, these applications should be clearly communicated rather than identified by generic nomenclature as simply "biotechnology." Because journalists have greatest faith in university scientists and less faith in biotech companies, private biotechnology companies may seek new and stronger partnerships with universities.

Although investigative/interpretive reporting is the most labor-intensive style of reporting (Denton, 1996), most journalists will employ this style when reporting on biotechnology. Because "news" articles about biotechnology compete with other stories for "play" in the newspaper, editors may be predisposed to choose news with sensational content. Journalists attached a high level of importance to human health, food quality, and environmental enhancements brought by biotechnology. It is recommended that these elements become a fixture in future research and educational messages.

Consumer education "in the news" may be the most important element to diffusing biotechnology innovations and to gaining public acceptance. Because almost 5% of the journalists responded that farmers or consumers would never accept food biotechnology as a farm practice, one might expect some continued opposition. This opposition, although small, will have a vocal presence in the media due to the marketability (e.g., controversial or sensational nature) of the opposing side in the biotechnology debate.

It is recommended that agricultural educators focus on media relations and educational components for diffusion of innovations of food biotechnology. It is recommended that universities and industry provide electronic access to food biotechnology information. Universities should develop a systematic approach that allows journalists to have personal experiences and personal contact with people who operate agricultural and food biotechnology enterprises. Universities should feature educational materials that communicate two-sided messages about biotechnology innovations addressing the social, economic, and cultural impacts of innovations. University scientists must examine relationships with biotech industry to maintain their credibility as objective and unbiased.

ERIC

IMPLICATIONS RELATED TO THE RESEARCH METHODS

Conducting this kind of innovation diffusion research is difficult; low response rate—caused in part by the following:

(a) some news organizations have policies against their employees responding to surveys,

(b) some journalists stated that answering the questionnaire would damage their professional integrity,

(c) some journalists said that they do not give their opinions; they must remain objective on topics they may write about,

(d) some journalists lacked interest in answering a survey that is not specific to their "beat"—threatens the results. That is, although internal validity may exist, external validity is threatened by mortality. The implication of the low response rate in this study is that generalization of findings to the target population is suspect. The study might justifiably be viewed as exploratory in nature and used to establish baseline information about journalists' knowledge, attitudes, and perception regarding food biotechnology.

PROGRAMMATIC RECOMMENDATIONS

Because the diffusion equation for biotech foods includes consumer education as well as producer education, universities should extend their academic and research mission to include marketing, media relations, and educational components for food biotechnology diffusion of innovations. It is recommended that universities and industry provide electronic access to food biotechnology information. Universities should develop a systematic approach that allows journalists to have personal experiences, experiential learning, and personal contact with people who operate agricultural and food biotechnology enterprises. Universities should feature educational materials that communicate two-sided messages about biotechnology innovations addressing the social, economic, and cultural impacts of introducing an innovation into a given social system.

Because journalists vary in degrees of acceptance of genetic modification of certain organisms (e.g., microorganisms, plants, animals, and humans), laymen's nomenclature should be established to distinguish between these practices. Also, biotech industry should use affective-based messages to inform consumers through "pharmaceutical type" advertising similar to those found in periodicals such as Redbook (Pfizer, 1998) and Readers Digest (Hoechst Marion Roussel, Inc., 1998). University scientists must examine relationships with private biotechnology industry to ensure the maintenance of credibility of the institution as objective and unbiased.

Some journalists believe that farmers and consumers will never accept food biotechnology. Too, the culture in the news environment contributes to negative and sensational news that generally gets prominent "play." These elements, coupled with the presence of small but vocal activist groups who have the "ear" of the media, equate to a need for universities to develop proactive (public education) and reactive (dispute resolution, response) approaches to controversial issues regarding food biotechnology.

RECOMMENDATIONS FOR ADDITIONAL RESEARCH

Additional experimental research involving journalists is needed to evaluate the effectiveness of various educational methods. A content analysis of marketing messages about products of food biotechnology is needed to identify the attention being given to consumer demands to know the effects of biotechnology on human health, food quality, and the environment. Research should assess the knowledge, attitudes, and perceptions of journalists as new food products of biotechnology enter the marketplace.

REFERENCES

Armstrong, D. L. (1991). Better crops with plant food. Potash & Phosphate Institute: Atlanta, GA.

Bare, J. B. (1995). Toward a definition of public journalism. (Doctoral dissertation, The University of North Carolina at Chapel Hill, 1995). UMI AAC9605092.

Barton, G. (1992). Roundtable survey: Attitudes toward the future of biotechnology in agriculture. St. Louis, MO: Monsanto Company.

Benedict, J. (1998, June). Position statement on insect-resistant transgenic crops: Potential benefits and risks. (Available from Department of Entomology Texas A&M University, Mail Stop-2475, College Station, TX. 77843).

Bruhn, C. M. (1997, Summer). Science meets policy: A report on the ABA-agricultural management task force roundtable on biotechnology. NewsCAST. Ames, IA: Council for Agricultural Science and Technology.

Chappell, C. R. & Hart, J. (1998). The challenge of communicating science to the public. The Chronicle of Higher Education, XLIV, 28.

Davis, J. A. (1971). Elementary survey analysis. Englewood, Cliffs, NJ: Prentice-Hall.

Denton, F. (1996). News styles and lifestyles: How Americans stay in touch with their communities. (Doctoral dissertation, University of Wisconsin-Madison). AAC 9627057.

Duhe', S.F. (1993). Monsanto and the media: The news process regarding biotechnology. (Doctoral dissertation, University of Missouri, Columbia, 1993). UMI Microform, 9404962.

Elias, J. L., & Merriam S. B. (1995). Philosophical foundations of adult education (2nd ed.). Malabar, FL: Krieger Publishing Company.

Fazio, R. H., Powell, M. C., & Williams, C. J. (1989) . The role of attitude accessibility in the attitude-to behavior process. Journal of Consumer Resources, 16, 3, 280-88.

Fowler, R., Hodge, B. Dress, G. & Trew, T. (1979). Language and Control. London: Routledge and Keegan Paul.

Hallman, W.K. (1995). Public perceptions of agri-biotechnology. Genetic Engineering News, 15(13) 4-5.

Hoban, T. J. & Kendall, P. A. (1993). Consumers attitudes about the use of biotechnology in agriculture and food production. (Available from North Carolina State University, Campus Box 8107, Raleigh, NC 27695).

Hoban, T. J., IV (1996). Anticipating public reaction to the use of genetic engineering in infant nutrition. American Journal of Clinical Nutrition, 63, 657S-662S.

Hoechst Marion Roussel, Inc. (1998). Ahhh! Allegra! Readers Digest, 153(915) 30-32.

International Food Information Council (IFIC) (1997). Consumer survey: The Wirthlin Group. (Available from IFIC, 1100 Connecticut Avenue N.W., Suite 430, Washington, DC).

Levins, H. (Ed.). (1997). Top 100 newspapers in the United States according to circulation. Editor & Publisher Yearbook. [Special issue]. 125, 45. New York: Editor & Publisher.

Lewis, H. W. (1990). Technological risk. New York: W. W. Norton.

May, R. (1969). Love and will. New York: Norton.

Mazur, A. (1981, Spring). Media coverage and public opinion on scientific controversies. Journal of Communication, 31, 114.

Naisbitt, J. (1990). Megatrends 2000. New York: Morrow.

National Agricultural Biotechnology Council (NABC) (1997). Agricultural biotechnology, [on-line]. <http://www.cals.cornell.edu: 80/ extension/nabc>.

Office of Technology Assessment (OTA) (1987). New developments in biotechnology: Public perceptions of biotechnology, OTA-BP-BA-45. Washington, DC: US Government Printing Office.

Peterson, S. L. (1996). Biotechnology in the public eye, 1973-1994: A content analysis of Time, Newsweek, and US News & World Report. (Masters thesis, Michigan State University, 1996). UMI 1381897.

Pfizer (1998, February). Discover breakthrough: Migraine relief that lets you stay alert and active. Redbook, 190(4) 103-04.

Re, Diana B. (1997, September 9). Biotechnology-What's here and what's coming. Research and technology transfer symposium conducted by Texas A&M University, College Station, TX.

Rogers, E. M. (1983). Diffusion of innovations (3rd ed.). New York: The Free Press.

Rogers, E. M. (1995). Diffusion of innovations (4th ed.). New York: The Free Press.

Sanbonmastsu, D. M., & Fazio, R. H. (1990). The role of attitudes in memory-based decision making. Journal of Personality and Social Psychology, 59 (4), 614-22.

Schoell, W. R. & Guiltinan, J. P. (1995). Marketing contemporary concepts and practices (6^{th} ed.). Englewood, NJ: Prentice Hall.

Schudson, M. (1995). The power of news. Cambridge, MA: Harvard University Press.

SPSS Inc. (1998). SPSS 7.5 for windows Windows95. [On-line]. http://www.spss.com/software/spss/spss75/. Chicago, IL: SPSS Inc.

Terry, R., Jr. (1994). Agricultural literacy of information gatekeepers. Proceedings of the Southern Agricultural Edcuation Research Meeting, 43, 198-210.

Wood, N. (1994, November). Foodwatch helps industry understand consumers. [Newsletter]. Washington, DC: Agricultural Council of America.

KNOWLEDGE, ATTITUDES, AND PERCEPTIONS OF JOURNALISTS FOR NEWSPAPERS IN METROPOLITAN MARKETS IN THE UNITED STATES REGARDING FOOD BIOTECHNOLOGY

A Critique

Susan Fritz
University of Nebraska

Sometimes studies are conducted that seem to have little relevance to current issues in agriculture, but this is NOT one of them. I commend the authors for conducting a study that seeks to address one piece of the food biotechnology puzzle.

The theoretical framework presented was sound and provided adequate background and rationale for the study. However, after reading that the population for the study was Levin's (1997) "Top 100 newspapers in the United States according to circulation" I was puzzled with the researchers' pursuit of only 96, rather than 100. What happened to the remaining newspapers? Similarly I was confused by the reference to conducting a pilot study of journalists at "50 similar newspapers." In what way were these 50 newspapers similar, to each other, to the Levin top 100? It would be helpful for the authors to clarify why it was appropriate to use these 50 in the pilot study.

Although the researchers encountered some respondent resistance inherent to the journalism profession, I commend the researchers for their seemingly tireless efforts to contact potential respondents. However, I was interested in the number of returns/responses associated with each of the six contacts. This mixed contact strategy used mailings and phone interviews--were interviewers trained? Was a standard script used during the phone interviews to guard against interviewer bias?

The conclusions and recommendations seem reasonable and offer much opportunity for agricultural educators and university scientists to assist in formal and informal education of consumers and journalists. Additionally, this study has implications for the content and scope of food biotechnology in agricultural literacy programs.

I concur with the researchers concerns about generalizability of the findings, but feel there may be an even bigger risk that challenges this study. Research which explores a dimension of a popular issue runs the risk of becoming dated if not published in a timely fashion. This study was conducted more than 1 ½ years ago, and there have been several key developments regarding food biotechnology that could impact the results of the study if conducted today.

Organizational Values of New Mexico Cooperative Extension Service Employees

Brenda Seevers
New Mexico State University

INTRODUCTION

We live in a rapidly changing society. Change, planned and unplanned abounds. Organizations striving to remain viable and effective amidst constant change must be willing to assess and adjust organizational philosophy, goals, objectives and processes to meet these changes. The use of proactive planning tools such as strategic planning are commonly utilized to effectively manage organizational change.

Strategic planning is defined as "a process that gives attention to 1) designing, 2) implementing, and 3) monitoring plans for improving decision making." The result of the strategic planning process is usually a 'written document that allows members to comprehend, analyze, and critique the goals, objectives, and strategies that are being used to achieve the organizations mission." (Simmerly, 1987. p.12). Most strategic planning models include as an early step the process of values clarification. Identifying organizational values is a critical step since such values influence directly how people behave.

All organizations are comprised of individuals with unique ideas, beliefs, attitudes and perceptions which collectively comprise the members' values. Rokeach (1973, p.5) defines a value as:

> "an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence. A value system is an enduring organizations of beliefs concerning preferable modes of conduct or end-states among a continuum of relative importance."

Values are enduring because they are neither completely stable or unstable, but rather change in accordance to the changing physical, social, and spiritual environments of the individuals and groups that embrace them. Like all beliefs, organizational values have cognitive, affective and behavioral components which continually interact and are exhibited in the actions and behaviors of the members of an organization (Rokeach, 1973). Every profession and every

ERIC

organization is guided by a set of beliefs and values. It is these "organizational values" that communicate what an organization believes in and what they considered to be important (Hitt, 1988). Conklin, Jones, and Safrit (1991, p. 1) wrote that an organizational value is 'any concept or idea that is held in high esteem by the members of an organization and that shapes the organization's philosophy, processes and goals." The values held by the members of an organization determine the organizational culture, which according to Simmerly (1987) is the most powerful internal force affecting any organization. Simmerly (1987, p. 15) states that "organizational culture defines expectations about behavior, how work is done, how decisions are made, how social interactions are structured and how people communicate."

A sign of healthy and productive organization is congruence between the organization's values and the behaviors of its' members. As the Cooperative Extension Service strives to keep up with the constant change of a rapidly moving society, questions regarding the values held by it's members must be considered. Two previous studies conducted in North Carolina (Safrit, 1990) and in Ohio (Conklin, Jones, & Safrit, 1991) with the Cooperative Extension Service have sought to answer these questions. This study will attempt to address some of the same questions. What are the organizational values for the New Mexico Cooperative Extension Service? Are values identified consistent with the current mission/goals and philosophies of NMCES? To what extent do employees perceive that identified organizational values are evident in the philosophies, processes and goals of the NMCES organization? And finally, are interventions necessary to provide for congruence between the organizational mission and the identified member values?

PURPOSE

The purpose of this study was to investigate the organizational values of New Mexico Cooperative Extension Service (NMCES) educators. Specific objectives for the study were to:

1. identify valid organizational values that are representative of NMCES educators; and
2. investigate possible relationships between organizational values of NMCES educators and their age, gender, ethnicity, job tenure, level of formal education, whether or not respondent was a county director, program area of responsibility and position within the organization.

METHODOLOGY

The population for this study was NMCES educators who were active at their assigned professional responsibilities at the time of the dissemination of the research instrument (N = 201). For purposes of this study an educator was defined as anyone employed by NMCES with educational program responsibilities including CES administration, state specialists, county agents, program assistants and nutrition educators. An up-to-date list of employees was obtained from the College of Agriculture and Home Economics Personnel Office. Permission to conduct the research study was granted by the Director of the New Mexico Cooperative Extension Service.

The dependent variables were the identified organizational values of the NMCES educators. The independent variables used in the study included age, gender, ethnicity, highest level of formal education, job tenure with NMCES, whether or not the respondent was a county director, major program area of responsibility, and the position within the organization.

A search of the literature found minimal references specific to organizational values of the Cooperative Extension Service. Two previous studies (Safrit, 1990; and Conklin, 1991) on organizational values specific to the Cooperative Extension Service served as the foundation for this study. Safrit's 1990 study assessed the organizational values of North Carolina Cooperative Extension employees. In 1991, Conklin, et.al. studied the organizational values of employees of the Ohio Cooperative Extension Service. The suggested values from the Ohio Cooperative Extension Service study and input from the New Mexico Cooperative Extension Service (NMCES) administrative cabinet identified 53 organizational values for NMCES.

A pilot instrument based on the 53 values was then constructed. A panel of experts was asked to assess the value statements for face and content validity. Based on this input, minor wording changes were made and one value item was dropped from the list. A 62 item Values Questionnaire was developed. Section 1 contained 52 value statements used to obtain information on the respondents' organizational values as educators of the NMCES (Table 1). Two four point Likert-type scales were included for each statement. For each statement, the respondent was asked to rate the degree to which he/she valued the statement, and to rate the degree to which the value was evident in the organizational policies and procedures. Response categories ranged from 1-to 4, with 1 representing "not valued," or "not evident;" and 4 representing "extremely valued," or "extremely evident." Section 2 of the instrument provided background information on the respondents. Information collected included: major program area of responsibility, job classification, whether or not the respondent was a county director, tenure within the NMCES, job tenure with other CES programs, highest level of formal education, academic major in highest degree area, ethnicity, gender and age.

Table 1: Identified organizational values for New Mexico Cooperative Extension Service (NMCES).

1. A clearly defined organizational mission
2. Our land-grant university connection
3. High standards of excellence in education programing
4. Quick response to clientele concerns/requests
5. Diversity among employees
6. Proactive educational programs
7. Our role in bringing about change in people's lives
8. Extension programs that help solve problems
9. Extension programs based on needs identified at the local level
10. Extension financial support form the state level
11. People-centered programs
12. Unbiased delivery of information
13. Direct client involvement in program planning
14. Shared organizational leadership among administrators, faculty/staff and clientele
15. Freedom/independence in programming
16. Extension financial support from the local level
17. Flexibility/adaptability in programming
18. Administrators who demonstrate sensitivity to personal and family responsibilities of employees
19. Good fringe benefits to employees
20. The federal, state, and local Extension partnership
21. Recruitment and screening of prospective employees resulting in hiring qualified people
22. Teamwork among co-workers
23. Networking/coalition building with other agencies/organizations
24. The use of emerging technologies in daily operations
25. Interdisciplinary programming efforts
26. Recognition of excellence in performance
27. A commitment to making programs available to all New Mexicans
28. Diversity among clientele
29. Credibility with clientele
30. The recognition that our employees are our organization's greatest resource
31. Honesty/integrity in our work
32. The equitable distribution of resources among program areas
33. The involvement of volunteers to multiply our educational outreach
34. Targeting clientele from rural areas
35. Faith in the ability to bring about a better future
36. Loyalty to the organization
37. Balance between rural and urban programs
38. The distribution of resources among program areas based on numbers of potential clientele
39. Helping people to help themselves
40. Opportunities for professional development
41. A well-marketed organizational image
42. Research-based programs
43. Extension financial support from the federal level
44. Useful/practical programs
45. Innovation/creativity in programming
46. Effective flow of communications through all organizational levels
47. Employee participation in an educational program in a foreign country
48. New Mexico CES as an integral part of New Mexico State University
49. A general awareness of global issues
50. Equal opportunities for male and female employees
51. Targeting clientele from urban areas
52. Preserving a rural way of life

ERIC

Reliability of the instrument was assessed using a pilot test. Employees of the Arizona Cooperative Extension Service were randomly selected form the 1997 - 1998 County Agents Directory to participate in the pilot study. Cronbach's Alpha coefficients were calculated for Section 1 as a measure of internal consistency. The first Likert-type scale pertaining to the extent that the concept or idea was valued had a coefficient of .90. The second Likert-type scale pertaining to the degree to which it was believed the concept or idea was evident had a coefficnt of .93. coefficient.

Data were collected in May and June 1998. Subjects were sent a package containing a cover letter, questionnaire, and postage paid, self-addressed envelope. Subjects on main campus were provided a return envelope but were requested to use the campus mail system. The cover letter was signed by the Extension Director to encourage participation in the study. Dillman's (1978) procedures for administration of a mail questionnaire was used. The questionnaire was presented in booklet form and contained a code number for follow-up purposes.

After follow-up efforts (an e-mail reminder, a second package, and a second e-mail reminder), a response rate of 72 percent (n=146) was achieved. To address non-response error, early respondents were compared to late respondents (Miller & Smith, 1983). No significant differences were found to exist between the early and late respondents thus allowing generalizing to the population (Miller & Smith, 1983). Data were analyzed using SAS (Version 6.08). Frequency distribution analysis was used to report descriptive statistics and rank expressed organizational values with the greatest agreement among respondents. Spearman Rho r-values between identified organizational values and selected demographic variables were calculated.

RESULTS

Value statements were ranked according to the percentage of respondents that rated the statement as "extremely valued." The top organizational values of the New Mexico Cooperative Extension Service were identified by selecting those values in which 75% of more or the respondents rated the value as "extremely valued." Fourteen top organizational values identified are listed in Table 2. Overall percentages of respondents listing the values as "extremely valued" ranged from 75 percent to a high of 92 percent. Of the top fourteen organizational values identified, the percentages of respondents rating the values as "extremely evident" ranged from a low of 27 percent to a high of 47 percent (Table 2). Of the top fourteen values ranked, only nine were ranked fourteen or higher as "extremely evident." The remaining four values were ranked as 30, 32, 33 and 36 in terms of evidence in the organization's philosophy, processes and goals.

ERIC Full Text Provided by ERIC

Table 2: Identified organizational values for New Mexico Cooperative Extension Service (NMCES) as perceived by employees.

Rank (Valued)	Identified Organizational Value	Valid % Extremely Valued	Valid % Extremely Evident	Rank (Evident)
1	Honesty/integrity in our work	92.3	45.5	(4)
2	Credibility with clientele	86.0	39.6	(13)
3	Helping people to help themselves	81.3	47.2	(2)
4	High standards of excellence in educational programs	81.3	28.4	(33)
5	Useful/practical programs	81.1	41.0	(9)
6	NMCES as an integral part of New Mexico State .University	81.0	42.7	(8)
7	Teamwork among co-workers	79.9	27.3	(36)
8	Administrators who demonstrate sensitivity to personal and family responsibilities of employees	79.6	44.3	(5)
9	Good fringe benefits to employees	78.3	46.1	(3)
10	Quick response to clientele concerns/requests	77.3	31.4	(30)
11	Flexibility/adaptability in programming	77.1	39.6	(14)
12	A commitment to making all programs available to all New Mexicans	76.4	44.1	(6)
13	Recognition that our employees are our organization's greatest resource	75.5	28.7	(32)
14	People centered programs	75.4	43.1	(7)

Correlation analysis using Spearmans' rho was use to assess possible overall relationships between the fourteen identified organizational values and selected demographic variables. The correlation analysis yielded a few significant but very low correlations at the .05 level of significance (Table 3). Significant correlations were found between six identified values and selected demographics. These correlations include a relationship between value 2-"quick response to clientele needs" and role as a county director; value 9-"credibility with clientele" and age; value 12- "helping people to help themselves" and numbers of years employed and age; and finally value 14-"New Mexico Cooperative Extension Service as an integral part of New Mexico State University" and the demographic variables of job position and highest degree achieved.

CONCLUSIONS AND RECOMMENDATIONS

A sign of a healthy and productive organization is congruence between the organization's values and the behaviors of its members. A values audit is an important first step in clarifying the values perceived by members. An audit also provides critical information necessary to examine current organizational philosophies and processes and determine congruence with existing behaviors and practices. As an initial step in the strategic planning process, a values audit provides the basis for decision making regarding the current and future direction of the organization. Consequently, it is recommended that the findings of this values audit be reviewed and compared to the existing vision and mission statements of the NMCES. Discrepancies should be addressed.

An analysis of the data showed that substantial differences were found between what New Mexico Cooperative Extension Service employees valued and their perceptions of evidence of those values in the policies, procedures and activities of the organization. Specifically four of the top 14 values (High standards of excellence in educational programming (33), teamwork among co-workers (36), quick response to clientele concerns/requests (30), and recognition that our employees are our organization's greatest resource (32)) were ranked 30 or lower (out of 52) in perceived evidence. It is encouraged that those values identified as having the greatest differences between beliefs and practices be reviewed and recommendations for action be implemented. Conklin, et al. (1991) suggest that a method for moving from the abstract to the concrete in this area is to identify "critical success factors" for each identified value.

Hitt (1988) defines a "critical success factor" as any action identified by an organization that is necessary for daily behavior to reflect the organization's values. For example, possible critical success factors for the value teamwork might be to 1) provide incentives for teamwork, and 2) recognize teamwork as a performance appraisal and/or promotion and tenure criteria. Some areas of change might necessitate policy or procedural changes such as providing monetary incentives or use in a promotion and tenure situation. Other changes such as increasing standards of excellence in programming might be addressed through procedures such as performance appraisal criteria or through staff development and inservice training opportunities.

Correlation analysis was used to assess the possible overall relationships between identified organizational values and selected demographic variables. Six statistically significant correlations were found at the .05 level of significance. Significant correlations were found between:

1) value 2: quick response to clientele concerns/requests and the variable role as a county director,
2) value 9: credibility with clientele and the variable age,
3) value 12: helping people to help themselves and the variables years with NMCES and age, and
4) value 14: NMCES as an integral part of NMSU and the variables job position and highest educational degree.

Caution needs to be urged, however, that although statistically significant correlations were found for these identified organizational values, they have limited practical significance.

Table 3: Correlations between identified New Mexico Cooperative Extension Service (NMCES) organizational values and selected demographics variables.

Selected Demographic Variable	Identified organizational Value (By Rank Number +)													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Program Area	-.1023	-.1221	-.0401	-.1512	-.0512	.0047	-.0379	-.0672	-.0745	.0040	-.0694	.0067	-.1210	-.0748
Job Position	.0961	-.0449	.0744	.0559	-.0836	-.0003	-.0012	-.0712	-.0185	-.0901	.0868	-.0346	-.0184	.1632*
Co. Director	-.0247	-.2010*	-.0987	.0746	.0720	.0253	.0342	-.0330	.0377	-.0466	-.0108	.1047	.0091	-.0816
Years. w/NMCES	.0639	.1168	.1122	-.1201	-.0778	-.0441	-.0825	-.0101	-.1208	-.1318	-.0239	-.2066*	-.0814	.0148
Highest Degree	.0465	-.0239	.0404	.1166	-.0856	.0048	-.0003	-.0431	.0704	-.0132	.1068	-.0431	.0330	.2014*
Ethnicity	-.1904	-.1052	-.1265	-.1166	.0252	-.0936	.1444	.1489	-.0872	-.0857	.0135	.0090	-.0199	-.1280
Gender	.0026	-.1564	.0321	.0484	.1091	.0565	.0408	.0335	-.0173	.0907	-.1091	.0474	.0309	-.1188
Age	-.0466	.0082	.0264	-.0842	-.0895	-.1021	-.1405	.0283	-.1663*	.0803	-.0391	-.1930*	-.0633	-.0460

r-values

This study is similar to two previous studies conducted in North Carolina and Ohio. State Cooperative Extension Services planning to initiate a Strategic Plan in the near future should consider replicating this study or utilizing some other values clarification method as recommended in the Strategic Planning Process. Due to the uniqueness of each state Cooperative Extension Service caution is urged in transferring the results of this study to any other state. It is also recommended that a follow-up study be conducted with the New Mexico State Cooperative Extension Service within 3-5 years to determine if value priorities have shifted and to assess the extent employees perceive that any discrepancies between perceived values and organizational practices have lessened.

Results of this study have been shared with the New Mexico Cooperative Extension Service administrative cabinet. Decisions for action and implementation must be made by those within the organizational structure.

REFERENCES

Conklin, N. L., Jones, J. M., & Safrit, R. D. (1992). Organization values of Ohio Cooperative Extension Service Employees. Proceedings of the International Symposium for Agricultural and Extension Education. Columbus, Ohio.

Conklin, N. L., Jones, J. M., & Safrit, R. D. (1993). Organizational values of Ohio State University Extension: Linking research to organizational decision and direction. Paper presented at the Midwest Research to Practice Conference in Adult, Continuing and Community Education. Columbus, Ohio. October 13-15.

Dillman, D. A. (1978). Mail and telephone surveys: The total design method. New York: John Wiley & Sons.

Hitt, W. D. (1988). The leader-manager: Guidelines for action. Columbus, Ohio. Batelle Press.

Miller, L. E. & Smith, K. L. (1983, September/October). Handling non-response issues. Journal of Extension, 21(5). 45-50.

Rokeach, M. (1973). The nature of human values. New York: The Free Press.

Safrit, R .D. (1990). Values stratification in the strategic planning process of an adult educational organization. Unpublished doctoral dissertation. North Carolina State University. Raleigh.

Simmerly, R. G., & Associates. (1987). Strategic planing and leadership in continuing education. San Francisco: Jossey-Bass Publishers.

ORGANIZATIONAL VALUES OF NEW MEXICO COOPERATIVE EXTENSION SERVICE EMPLOYEES

A Critique

Susan Fritz
University of Nebraska

This study explored organizational values of New Mexico Cooperative Extension Service educators. In the introduction of the paper, the authors provided a limited, traditional discussion of values, goals and the strategic planning process. The inclusion of organizational behavior references to the work of Peter Senge, James MacGregor Burns and/or J. Thomas Wren would have strengthened the theoretical framework and the linkage between values, goals and strategic planning, and Cooperative Extension Service studies conducted in North Carolina and Ohio.

The researchers are to be commended for building upon previous Cooperative Extension Service organizational values research and developing an instrument that has potential for use in other states. Although the process of construction and administration of a pilot instrument was appropriate, I am interested in the number of Arizona Cooperative Extension Service employees that were involved in piloting. This is particularly important given that Cronbach's Alpha coefficients were established as a result of the piloting effort. The description of the instrument and inclusion of the 52 value statements (Table 1) are appreciated and provide the reader with a thorough understanding of the instrumentation.

The researchers adequately addressed the first objective, clearly presenting and discussing those organizational values ranked (valued) by employees. Another table, or even a short paragraph, discussing those values ranked lowest would have been important as well. The second objective had the potential to strengthen the study but the interpretation of the results of the correlation analysis fell short. Particularly disappointing was the paraphrasing of the Results paragraph in the Conclusions and Recommendations section. If a correlation is found between values and demographics, what are the implications? Could these differences account for challenges the organization has or may encounter related to employee motivation, organizational citizenship, career advancement, turnover, etc.?

Toward the end of the paper, the researchers call for a follow-up study in 3-5 years. Using the present study as the baseline, and analyzing shifts in the organizational values could serve as very helpful information for New Mexico Cooperative Extension Service decisionmakers. The fact that this study has been shared with the New Mexico Cooperative Extension Service administrative cabinet means that in this instance research has the potential of informing practice, and hopefully positively impacting the organization's future. Of similar importance would be reporting the results of the study to employees in the organization.

NAERC '99
Fresh
Florida

Factors Influencing an Extension Agent's Choice of Pursuing Either the Faculty or the Administration and Professional Career Track

Rosemary Gliem
The Ohio State University

INTRODUCTION AND THEORETICAL FRAMEWORK

The effectiveness of Extension has always depended on its human resources base (Chesney, 1992). Therefore, any changes in Extension's personnel base may affect the organization. During the 1980's, the number of faculty agents in Ohio State University (OSU) Extension was dramatically reduced mainly because faculty agents were offered the option of early retirement (Little, 1993). In order to fill the vacant county agents' positions OSU Extension hired mostly associate agents who had a non-faculty appointment which mainly meant that associate agents did not have the option to secure tenure. While faculty agents had opportunities for promotion to the next level, the associate agents did not have any career ladder to pursue. Little (1993) found that associate agents were frustrated with the lack of opportunity for promotion. Barrett (1994) concluded that faculty agents and associate agents wanted to equalize their benefits and vacation time. In response to these research findings and communication with agents on January 1, 1994, OSU Extension implemented the two track system which allowed agents to choose a career track - faculty or administrative and professional (A & P). The two track system provided A & P agents (formerly associate agents) opportunities for promotion by incorporating a

ERIC

career ladder and professional growth. The two track system also provided evaluation criteria for both faculty and A & P agents based upon their research, teaching, and service activities. Ultimately, the two track system was developed as an incentive for all Extension agents to grow professionally regardless of which career track was chosen. Currently, the 55 Extension services affiliated with land grant universities classify their county agents as either faculty or non-faculty so the two track system is a unique feature of OSU Extension.

According to Sommers (1995), workforce demographics will change due to the increase of workers in the 25 - 34 year range along with the increasing number of women in the workforce. Competition from the private sector for competent workers is a concern for Extension. Chesney (1992) noted that Extension must offer incentives, educational opportunities, and career ladders to attract competent personnel. The critical factors for productivity in Extension are attitudes, relationships and job enrichment (Chesney, 1992).

Findlestein and LaCelle-Peterson (1992) defined junior faculty which new faculty is a subgroup similarly to Extension agents who have chosen the faculty track. Extension agents who have chosen the A & P track are similar to what the authors defined as non-tenure track faculty. The one major difference between junior faculty and non-tenure track faculty was the disproportionate number of women in the non-tenure track. Tenure track faculty were found to rely on the intrinsic aspects of their work such as, autonomy and professional growth to derive job satisfaction (Olsen & Sorcinelli, 1992). Tenure track faculty placed a high value on recognition of teaching and scholarship by administrators (Olsen & Sorcinelli, 1992).

For non-tenure track faculty a main problem area was inadequate feedback and recognition from the university (Sorcinelli, 1992). Specifically, non-tenure track faculty identified unclear criteria for evaluating teaching, research, and service along with the lack of recognition by the university. Also, non-tenure track faculty indicated that a greater amount of their work lives interfered with their personal lives than tenure track faculty.

Besides personal differences between tenure track faculty and non-tenure track faculty, the faculty track in the two track system places a greater emphasis on research in the evaluation criteria and offers an agent a larger salary base than the A & P track. How influential is the differences in research criteria and salary between the faculty track and the A & P track in determining which track an agent chooses?

Boyer (1990) alerted higher education to reconsider what it means to be a scholar in today's world. Boyer concluded that universities had an obligation to broaden the scope to include not only research (basic) but the following interactive dimensions: the scholarship of discovery, the scholarship of integration, the scholarship of application, and the scholarship of teaching. Rice (1996) concluded that the new American scholar will be more responsive to issues beyond higher education, i.e., community, nation, and world, and will experience a greater connection between a faculty's personal and professional lives. Schon (1995) argued that most research universities subscribe to a too narrow definition of what counts as scholarship. Locke (1995) noted that scholarship should evolve across the career stages of a faculty member and should include not only individual accomplishments but collective, departmental efforts. Miller and Sandmann (1998) suggested for the discipline of agricultural education the definition of scholarship could be expanded to include the following categories: outreach research (publication, awards, applied

research), outreach teaching (observation reports, enrollment demands, new course development), and outreach service functions (impacts on research and teaching, impact on public policy, evaluation of service).

What factors influenced an agent's decision to choose the faculty or the A & P track? How does the choice of career track relate to an agent's attitude toward the academy? The two track system broadened the definition of research to include such activities as presentations at national, regional, and district meetings.

PURPOSE AND OBJECTIVES

The purpose of this study was to collect data on OSU Extension agents who had the option under the new policy of choosing either the faculty or the A & P career track in OSU Extension. The specific objectives of this study were to:

1. Describe agents in terms of their demographic characteristics.
2. Identify the factors that best discriminate between agents who chose the faculty track and agents who chose the A & P track.

METHODS AND PROCEDURES

The population for this descriptive-correlational study was all OSU Extension agents hired on or after January 1, 1994 through October 31, 1997. Ninety-one agents were identified and surveyed for this study.

This study used both qualitative and quantitative methodologies - a concept referred to by Patton (1987) as triangulation. Triangulation, especially in exploratory research, may help explain rival factors. Focus group interviews were conducted in three of the five Extension districts based upon the number of faculty and A & P agents in each district. Focus group interviews were conducted in the following districts: the district that had the most faculty agents, the district that had the most A & P agents, and the district that had the closest to a 50/50 split between both groups. The purpose of the focus group interviews was twofold: to collect information for the development of the mail questionnaire and to allow the researcher to get a better understanding of the issues surrounding the two track system. The focus group participants were stratified based upon their year of hire (1994, 1995, 1996) and were randomly chosen for participation in the focus group interviews.

The questionnaire was developed based upon the results of the focus group interviews and a review of the related literature. The questionnaire consisted of the following three parts: (a) 28 Likert-type statements which measured attitudes toward the academy(scholarship of discovery, scholarship of integration, scholarship of application, and the scholarship of teaching and five Likert-type statements measured attitudes toward balancing work and family; (b) two statements which measured how influential the differences in salary and research criteria were towards an agent's decision to choose either the faculty or the A & P track; and (c) demographic information. The questionnaire was submitted to a panel of experts which consisted of five agricultural education faculty, two Extension administrators, one district director, and two former county

agents who were graduate students at the time. The questionnaire was field tested with 12 OSU Extension agents hired in 1993. The following Cronbach's alphas were achieved on the subscales: the scholarship of discovery .61, the scholarship of integration .65, the scholarship of application .82, the scholarship of teaching .67, and balancing work and family .64. According to Nunnally (1967), these coefficients fall within the acceptable range for exploratory research. A test-retest reliability coefficient (percentage of agreement) was calculated for the following subscales: scholarship of discovery .70, scholarship of integration .79, scholarship of application .78, scholarship of teaching .86, and balancing work and family, .73.

Respondents were asked to rate individual statements using a Likert-type scale where 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree. The five subscales were each summated and used as independent variables with the agent's choice of faculty or A & P track as the dependent variable. The two questions on salary and research criteria differences were dummy-coded and used as independent variables in the analysis.

Salant and Dillman's (1994) method of survey research was used in this study. A total of 87 usable questionnaires were returned out of a possible 91 which was a 96% response rate.

Data were analyzed using SPSS version 8.0 for windows. Descriptive statistics were used to summarize the data. The point biserial correlation and the phi coefficient were used to determine the relationships between the independent variables and the dependent variable. Stepwise discriminant analysis was used to determine the best discriminators of the dependent variable. The standardized discriminant function coefficients were used to determine which variables contributed the most to the discriminant function. The pooled with-in group matrices were used to determine the relationships among the independent variables. Davis (1971) conventions were used to describe the correlational relationships. The qualitative data were analyzed using the cut-and-folder method outlined in Bogdan and Biklin (1992). The alpha level was set at .05 a priori.

RESULTS

Table 1 reports the demographic characteristics of the Extension agents. Of the 87 agents 52% were male and 48% were female. There were more males in the faculty track, 69%, than females, 31%. The A & P track was mostly female, 57%, with males comprising 43%. The average age of all agents was 34 years old (range from 23 to 61 years of age) with faculty agents being on average 32 years old and A & P agents being 36 years old. The racial/ethnic composition of all agents was 94% white, 5% black/African-American, and 1% Asian.

For the total number of agents most had the title of Extension Agent II, 49%. The next most frequent title was Extension Agent I (entry level), 40% followed by Extension Agent III, 7%, Assistant Professor 3%, and Extension Agent IV, 1%. For all agents the most frequent occurring program area an agent was employed in was 4-H/Youth Development, 39%, followed by Agriculture and Natural Resources, 28%, and a tie for third place between Community Development and Family and Consumer Sciences, 13% respectively. There were more 4-H/ Youth Development agents in the A & P track than the faculty track.

For all agents 61% were married followed by single, never married, 25%, divorced, 10%, and married, but currently separated, 3%. For the highest level of education attained 56% of all agents had a master's degree followed by some graduate work, 33%, post master's degree work, 7%, doctorate, 2%, and a 4-year college degree, 1%.

For all agents 34% stated that the influence of the differences in salaries between the faculty and the A & P track were a little influential in their decision followed by 29% who indicated that it was somewhat influential, 21% indicated it was moderately influential, and 14% reported that is was very influential. For A & P agents 47% indicated it was a little influential followed by 33% who stated it was somewhat influential, 17% who stated it was moderately influential, and 2% who stated it was very influential. For faculty agents 38% reported that it was very influential followed by 28% who stated it was moderately influential, 21% who stated it was somewhat influential, and 10% who stated it was a little influential.

For all agents 43% responded that the differences in research criterial between the two tracks was very influential in their decision followed by 30% who stated it was moderately influential, 15% stated it was somewhat influential, and 13% indicated it was a little influential. For A & P agents 47% indicated it was very influential followed by 34% who stated it was moderately influential, 12% who stated it was somewhat influential, and 7% indicated it was a little influential.

Table 1. Demographic Characteristics of OSU Extension Agents (n=87)

Characteristic	Faculty (n=29)		A&P (n=58)		Total (n=87)	
	f	%	f	%	f	%
Gender						
Male	20	69	25	43	45	52
Female	9	31	33	57	42	48
Racial/Ethnic Background						
Asian	1	3	-	-	1	1
Black/African-American	-	-	4	7	4	5
White	28	97	54	93	82	94
Title						
Extension Agent I	12	41	22	38	34	40
Extension Agent II	13	45	30	52	43	49
Extension Agent III	1	3	5	9	6	7
Extension Agent IV	-	-	1	2	1	1
Assistant Professor	3	10	-	-	3	3
Appointment (≥ 50%)						
Ag. & Natural Resources	10	34	14	24	24	28
Community Development	5	17	6	10	11	13
Family & Consumer Sciences	3	10	8	14	11	13
4-H/Youth Development	10	34	24	41	34	39
Marital Status						
Married	18	62	35	60	53	61
Single, Never Married	9	31	13	22	22	25
Divorced	2	7	7	12	9	10
Married, but Currently Separated	-	-	3	5	3	3
Highest Level of Education						
4-Year College Degree	-	-	1	2	1	1
Some Graduate Work	11	38	18	31	29	33
Master's Degree	14	48	35	60	49	56
Post Master's Degree Work	2	7	4	7	6	7
Doctorate	2	7	-	-	2	2

On the five summated scales faculty agents had slightly higher means than A & P agents except on the balancing work and family scale (Table 2). Since this was a census study, it was not appropriate to calculate any inferential measures on the means.

Table 2. Means, Standard Deviations, Point Biserial Correlations, and Phi Coefficients for the Independent Variables

Independent Variable	Faculty		A&P			
	Mean	sd	mean	Sd	r_{pb}	Phi
Demographic Variables						
Age	32.00	7.42	35.60	8.78	.20	
Gender[a]	.69	.47	.43	.50		.24
Racial/Ethnic Background[b]	.97	.19	.93	.26		.07
Title[c]	.90	.31	1.00	.00		.27
ANR Appointment[d]	.34	.48	.24	.43		.11
CD Appointment[d]	.17	.38	.14	.35		.05
FCS Appointment[d]	.10	.31	.26	.44		.18
4-H Appointment[d]	.34	.48	.41	.50		.07
Other Appointment[d]	.00	.19	.00	.18		.00
Marital Status[e]	.62	.49	.60	.49		.02
Highest Level of Education[f]	.62	.49	.67	.47		.05
Other Factors						
Salary Differences[g]	.11	.31	.47	.50		.36
Research Criteria[h]	.34	.48	.47	.50		.11
Attitudes Regarding the Academy						
Discovery	21.69	3.27	20.89	2.44	-.14	
Integration	31.41	3.61	30.88	3.57	-.07	
Application	35.10	3.46	33.10	2.97	-.29	
Teaching	23.72	2.49	22.05	3.43	-.24	
Issue						
Balancing Work and Family	14.45	3.63	14.55	2.80	.02	

[a]: Male = 1, Female = 0; [b]: White = 1, Minority = 0; [c]: A & P = 1, Faculty = 0; [d]: $\geq$ 50% = 1, <50% = 0;[e]: Married = 1, Unmarried = 0; [f]: $\geq$ Master's degree = 1,< Master's degree = 0; [g]: Little Influential = 1, > Little = 0; [h]: Very Influential = 1, < Very Influential = 0

The variables age, gender, title, and FCS appointment had a low association (Davis, 1971) with the dependent variable. The differences in salaries had a moderate association with the dependent variable while the differences in research criteria had a low association with the dependent variable. For the summated scales the scholarship of discovery, application, and teaching had a low association with the dependent variable.

460

Summary data for the discriminant analysis are reported in Table 3. There was one discriminant function because there were two groups. The null hypothesis tested was that in the population there will be no difference between the group centroids on the discriminant scores. The level of significance associated with the chi-square was less than alpha (.05) so the null hypothesis was rejected. A Wilks' lambda of .75 indicates that 75% of the variance was unexplained. Structure coefficients (s) were considered if the absolute value was equal to or greater than .30 (Hair, et al., 1995). The standardized canonical discriminant coefficients (b) were interpreted using the general rule that the coefficients whose absolute value is not less than

Table 3. Summary Data for Discriminant Analysis

	Discriminant Function1			
Variables	b	s	Group Centroids	
The Scholarship of Application	-.62	-.64	Faculty	-.816
Influence of Salary Differences	.59	.62	A & P	.401
Age	.51	.45		
The Scholarship of Integration[a]		-.22		
Race/Ethnic Background[a]		-.19		
ANR Appointment[a]		-.12		
Marital Status[a]		-.07		
The Scholarship of Teaching[a]		-.07		
Title[a]		.06		
Gender[a]		.06		
Research Criteria[a]		-.06		
Balancing Work and Family[a]		.05		
Highest Level of Education[a]		.04		
CD Appointment[a]		.03		
FCS Appointment[a]		-.01		
4-H Appointment[a]		-.01		
The Scholarship of Discovery[a]		-.00		

Eigenvalue	Rc	Wilks'Lambda
.33	.50	.75

[a] These variables were not used in the discriminant analysis.
[b] = standardized canonical discriminant function coefficients
[s] = structure coefficients
Rc = canonical correlation coefficient

one half of the largest value are considered in the discriminant function (Hair, et al., 1995). The variables which contributed the most to the discriminant function were the scholarship of application (b= -.62), the influence of the differences in salary (b= .59), and the

agent's age (b= .51). The same variables loaded high on the discriminant function when analyzed by their structure coefficients - the scholarship of application (s = -.64), the influence of the differences in salary (s= .62), and the agent's age (s= .45).

The discriminant function accounted for 25% (Rc= .50) of the variance which could be explained by the two groups (Table 3). The proportion of variance unexplained was 75% (Wilks' lambda = .75). The eigenvalue of .33 (Table 3) indicates that the discriminant function can explain .33 times as much as is not being explained. The classification of cases (Table 4) reports that 72% of the cases were correctly classified based upon its discriminant score.

Table 4. Classification of Cases

Group	Number of Cases	Predicted Group	
		Faculty	A & P
Faculty	29	21	8
		72.4%	27.6%
A & P	58	6	42
		27.6%	72.4%
Percent of Cases Correctly Classified: 72%			

CONCLUSIONS

The typical faculty agent in this study was on average 32 years old, male, white Extension agent II, employed full-time as an 4-H/Youth Development agent, married, and had a master's degree. Faculty agents in general scored higher than A & P agents on the scholarship of application scale which was on one of the discriminating variables that corresponded with the faculty agent group. The typical A & P agent was on average 36 years old, female, Extension agent II, employed full-time as an 4-H/Youth Development agent, married, and had a master's degree. A & P agents were not as influenced by the differences in salary levels, a discriminating variable for A & P agents, between the two groups even though the faculty agents were at a higher base salary. A & P agents were also older on average than faculty agents with age being a discriminating variable for A & P agents.

When entering OSU Extension, agents are more likely to choose the A & P track. If agents continue to choose the A & P track over the faculty track, administrators need to consider what effect, if any, this has on the organization. Long term implications to the organization of having more A & P agents than faculty agents need to be addressed.

Agents entering the organization who indicate a preference for the faculty track tend to by younger, male, more influenced by salary differences between the two tracks, and less likely to be in the 4-H/Youth Development or FCS program areas. If Extension administrators want to encourage agents to pursue the faculty track, these variables need to be further reviewed and supported by possibly offering some career development information and/or being aware of the agent's career aspirations.

ERIC Full Text Provided by ERIC

Attitudes toward the academy and the issue of balancing work and family did not differ greatly for agents in the faculty or the A & P track. Since the groups do not differ attitudinally for all practical purposes, Extension administrators should not assume that agents choosing one track over the other have different levels of commitment to and motivation toward the organization (Cherniss, 1991; Granrose & Partwood, 1987). Agents in both tracks need to feel valued by the organization.

RECOMMENDATIONS FOR FURTHER STUDY

Further study is needed to determine whether there are differences in outcomes between faculty and A & P agents in terms of serving the needs of targeted clientele. Determining if there are outcome differences between the two tracks may help OSU Extension administrators reevaluate the two track system in regards to how the system facilitates an agent's professional development and the goals of the organization.

Studies are needed to explore the differential career development needs of males and females in the four Extension program areas. OSU Extension needs to determine what motivates agents to choose either the faculty or the A & P track and thereby help each person achieve his or her career potential (Cherniss, 1991).

The literature suggests that differences exist between tenure and non-tenure track individuals such as, non-tenure track individuals have higher levels of stress and tenure track individuals were found to be more intrinsically motivated than non-tenure track individuals (Olsen & Sorcinelli, 1992; Sorcinelli, 1992). Even though no differences were found between agents who are more likely to choose the faculty track or the A & P track regarding their attitudes toward the academy and balancing work and family, further study is needed to identify other factors which may lead to a better understanding of the differences. The two track system is relatively new so additional studies are needed to determine what trends and issues may influence an agent's choice of either track.

REFERENCES

Barrett, J. M. (1994). Perspectives on multicounty staffing in Ohio State University Extension. Unpublished master's thesis, The Ohio State University, Columbus, Ohio.

Bogdan, R. & Biklen, S. (1992). Qualitative research for education (2nd ed.). Needham Heights, MA: Allyn and Bacon.

Boyer, E. L. (1990). Scholarship reconsidered: Priorities of the professoriate. Princeton, NJ: Carnegie Foundation for the Advancement of Teaching.

Cherniss, C. (1991). Career commitment in human service professionals: A biographical study. Human Relations, 44, 419 - 437.

Chesney, C. E. (1992). Work force 2000: Is Extension agriculture ready? [16 paragraphs]. Journal of Extension [On-line serial], 30 (2). Available E-mail: <almanac @joe.ext.vt.edu> Message: Send joe summer 1992 futures 2

Davis, J. A. (1971). Elementary survey analysis. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Findlestein, M. J. & LaCelle-Peterson, M. W. (1992). New directions for teaching and learning, number 50 , 5 - 14.

Granrose, C. K. & Portwood, T. D. (1987). Matching individual career plans and organizational career management. Academy of Management Journal, 30 (4), 699 - 720.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1995). Multivariate data analysis (4th ed.). Englewood Cliffs, NJ: Prentice Hall.

Little, R. C. (1993). Perspectives on cluster units in the Ohio cooperative extension service. Unpublished master's thesis. The Ohio State University, Columbus, OH.

Locke, L. F. (1995). An analysis of prospects for changing faculty roles and rewards: Can scholarship be reconsidered? Quest, 47, 506 - 524.

Miller, L. E. & Sandmann, L. (1998). Redefining scholarship: Implications for agricultural education. Paper presented at the 52nd Annual AAAE Central Region Research Conference, St. Louis, MO.

Nunnally, J. C. (1967). Psychometric theory. New York: McGraw Hill.

Olsen, D. & Sorcinelli, M. D. (1992). The pretenure years. In R.J. Menges & M. Svinicki (Eds.), New directions for teaching and learning, number 50, (pp. 15 - 25). San Francisco: Jossey-Bass.

Patton, M. Q. (1989). How to use qualitative methods in evaluation. Newbury Park, CA: Sage.

Rice, R. E. (1996). Making a place for the new American scholar. Inquiry #1, part of the working paper series. Washington, DC: American Association for Higher Education.

Salant, P. & Dillman, D. A. (1994). How to conduct your own survey. New York: John Wiley & Sons.

Schon, D. A. (1995). The new scholarship requires a new epistemology. Change, 27 (6), 27 - 34.

Sommers, P. C. (1995, May 15). Workforce 2000. IW, 244 (10).

Sorcinelli, M. D. (1992). New and junior faculty stress: Research and responses. In R. J. Menges & M. Svinicki (Eds.), New directions for teaching and learning, number 50, (pp. 27 - 37). San Francisco: Jossey-Bass.

Statistical Package for the Social Sciences, SPSS(1998). Base 8.0 for Windows. User's Guide. Chicago, SPSS, Inc.

FACTORS INFLUENCING AN EXTENSION AGENT'S CHOICE OF PURSUING EITHER THE FACULTY OR THE ADMINISTRATIVE AND PROFESSIONAL CAREER TRACK

A Critique

Susan Fritz
University of Nebraska

This study sought to identify critical considerations that influence career track choices of Ohio State University Cooperative Extension agents. The introduction and theoretical framework adequately captures the history of the development of the two track system and references earlier studies which explored related issues.

The use of focus group interviews to develop the questionnaire was an appropriate strategy. The description of the groups could have been more thorough, however, revealing the numbers of participants in each of the groups, and the stratification by group and overall. The researchers are to be commended for the excellent response rate achieved in the study. The 96% rate is intriguing: when was the study conducted, over what period of time was data collected, how were the questionnaires distributed, how many follow-ups were conducted, was a comparison made between early and late respondents? These are important questions and by including this information the Methods and Procedures section could be strengthened.

The analysis is sophisticated and the results address the purpose and objectives of the study. Something that was puzzling, though, was the reference to testing the null hypothesis "that in the population there will be no difference between the group centroids on the discriminate scores." The first mention of a null hypothesis in the study is made in the Results section. If the author preferred to state a null hypothesis it should have occurred sooner and likely been placed in a retitled "Purpose and Objectives" section. Because this was a census study, and no generalizations were being made to a population, I wonder if less sophisticated analysis procedures would have yielded similar results.

The researcher's conclusions are well substantiated, and offer some challenges for Ohio State Cooperative Extension. If more incoming agents opt for the administrative and professional track, how will this impact balance and achievement of the mission of the organization? If males are more likely to choose the faculty track then females, what kinds of development opportunities can be offered to encourage an equal number of females and males selecting both tracks? Although these differences were evident, the common concern of agents in both tracks regarding balance between their personal and professional life is not unique to Ohio State Cooperative Extension.

The paper concludes with several excellent suggestions for further study regarding the two-track system. One additional investigation would be a longitudinal study of careers (e.g. professional development plans, length of employment, advancement inside and outside of the organization) of agents in both paths to determine if one path offers more opportunities and has more perceived organizational value than the other.

NAERC '99

Research Fresh from Florida

An Analysis of a Combined Quantitative/Qualitative Approach for Conducting Research in Agricultural Education

Mark Balschweid
Purdue University

Gregory Thompson
Oregon State University

R. Lee Cole
Oregon State University

INTRODUCTION/THEORETICAL FRAMEWORK

Historically, research in agricultural education has focused on a positivist perspective. When reviewing proceedings and journal articles regarding agricultural education it is difficult to find research using an interpretivist design. Indeed, many agricultural education researchers scoff at the "other" research methodology called qualitative, suggesting that it is soft and useless for the task of true measurement of phenomena. Recently, however, social scientists have argued convincingly for a place for qualitative methodology at the research table. As researchers it is important for us to examine all forms of research methodology to determine the existence of benefits to alternative practices of data collection. This paper seeks to look at the advantages and the disadvantages of using a combined qualitative and quantitative approach to collecting data pertinent to agricultural education teacher preparation.

ERIC

The recognition of "mixed methods" stems from the understanding that complex social phenomena are often best comprehended by looking at them through both quantitative and qualitative lenses (Waysman & Savaya, 1997). Campbell and Martin (1992) state:

> [W]e in agricultural education are, in a sense, doubly caught in this net of scientific inquiry, because our field of study is not only based on the foundation discipline of psychology, but on that of agriculture as well. It can be noted here that scientific inquiry, as we know it, stems directly from the plant genetics work of Mendel. Agricultural education comes by these empirical practices legitimately. They have served us well up until now (Campbell & Martin, 1992, p. 55)

It is easy to see why quantitative methodology has been used and will continue to be used in our profession. But questions persist as to whether it is the best tool or the only tool for our profession today. Quantitative research designs are well suited for identifying general trends in populations (Gall, Borg & Gall, 1996 p. 585). When describing phenomena at one point in time, or over a period of time, quantitative research design is effective for collecting data from large populations and identifying the beliefs, understandings, and information of subjects. Although not able to describe in-depth, exhaustive detail regarding the subjects, quantitative design instruments can gather volumes of useful information.

Why, then, perform qualitative research? Strauss and Corbin (1990) point out that:

> [One] reason is the nature of the research problem. Some areas of study naturally lend themselves more to qualitative types of research, for instance, research that attempts to uncover the nature of persons' experiences with a phenomenon, like illness, religious conversion, or addiction (Strauss & Corbin, 1990, p.19).

For those involved with agricultural education teacher preparation it can be a useful tool as we witness change after change imposed upon the old paradigm of "vocational agriculture" and adapt to new expectations and market forces propelling agricultural education into the 21st century. Furthermore, qualitative research methodology can uncover intricate pieces of evidence that are difficult to obtain using quantitative methods.

Denzin and Lincoln (1994) define qualitative research as "multi-method in its focus, involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meaning people bring them" (Denzin & Lincoln, 1994, p. 2). Additionally, previous literature has provided the rationale and has suggested conceptual frameworks for conducting mixed method research (Waysman & Savaya, 1997), however very little has been published concerning the use of these methods in agricultural education teacher preparation.

Can a mixed method research methodology have a positive effect upon agricultural education teacher preparation? Can innovative methodologies expose problems and solutions difficult to obtain using traditional quantitative designs? With opportunities to influence change in the way agricultural educators are trained it seems incumbent upon teacher trainers to utilize every available tool in order to insure the customers, both the pre-service teachers and the schools

ERIC Full Text Provided by ERIC

they will one day teach in, that agricultural education is sensitive to the changing landscape in teacher preparation. With thoughts like these in mind the time is long overdue to examine the effects of using both quantitative and qualitative research methodologies.

PURPOSE/OBJECTIVES

The purpose of this study was to determine how using a mixed method approach combining quantitative and qualitative research methodologies affected the design, interpretation, conclusions, and presentation of results in a study focused on agricultural education teacher preparation. The context for this mixed method study was the observation of perceptions of pre-service agricultural education teachers towards the presentation of an integrated agriculture and science curriculum.

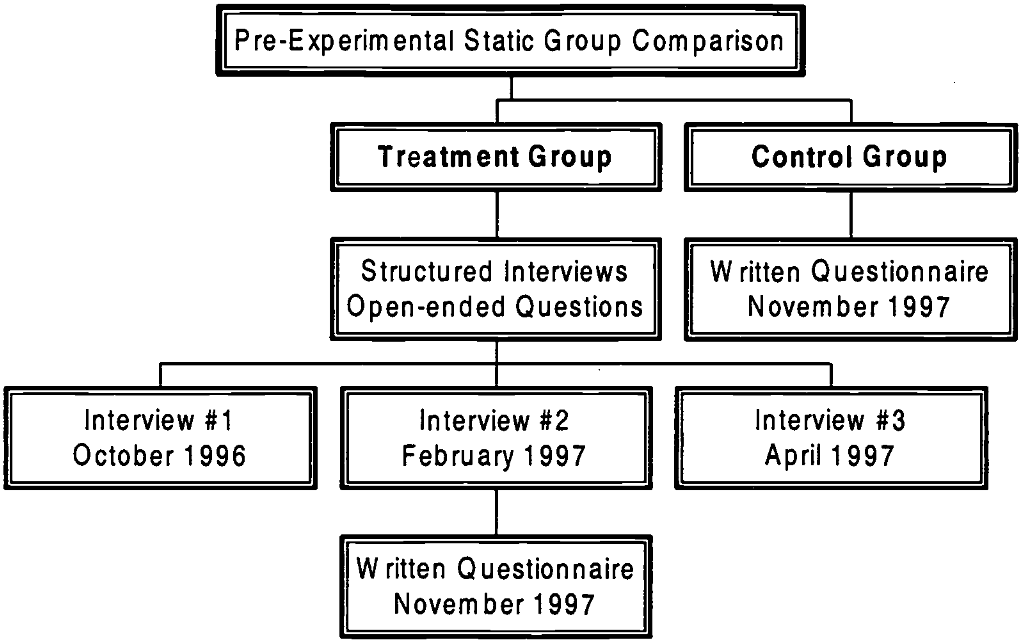
The design of the study was pre-experimental, static group comparison (see Figure 1). According to Gall, Borg and Gall (1996) "the static-group comparison design has two characteristics: research participants are not randomly assigned to the two treatment groups; and a posttest, but no pretest, is administered to both groups". Furthermore, the authors state "the main threat to internal validity in this design is that posttest differences between groups can be attributed to characteristics of the groups as well as to the experimental treatment" (p. 507).

With smaller sample sizes and the inability to randomly assign subjects to either the treatment group or the control group, the static-group comparison became the most conceivable design to use in the research under analysis. The study being analyzed was composed of six members in the treatment group while 15 teachers made up the control group. These numbers represented the entire population of students participating in an Agricultural Education Teacher Training program at a Pacific Northwest Land Grant University.

The research questions used to guide the original investigation were stated as follows:

1. What was the need felt by pre-service agricultural education (Master of Arts in Teaching) teachers to update their curriculum through integration and collaboration efforts and to include more scientific principles in their agriculture curriculum?
2. What was the level of collaboration and curriculum integration carried out by selected members of the 1996-97 agricultural education MAT pre-service teacher cohort as compared with cohorts from the previous five years?

Figure 1
Research Schematic of Agriculture and Science Integration Study



In addition, a third research question was added for the specific investigation of identifying the benefit(s) of a mixed method research methodology:

3. How did the interpretation of the qualitative and quantitative data compare and/or contrast?

METHODS/PROCEDURES

The research study being analyzed in this paper used a combination of qualitative analysis and quantitative analysis to utilize the strengths of each research methodology. Reichardt and Rallis (1994) state:

> A defensible understanding of reality can withstand scrutiny from different perspectives and methodologies. Indeed, given its complexities and multiple facets, a complete understanding of human nature is likely to require more than one perspective and methodology. The qualitative and quantitative traditions can provide a binocular vision with which to deepen our understandings. That the qualitative and quantitative perspectives remain partly adversarial in their relationship does not preclude cooperation in working together toward their shared goal. In fact, just the opposite is true. By working together, the two traditions can enhance the practice and utilization of research and evaluation (p. 11).

Specifically, the research combined a series of personal interviews with the treatment group in addition to a written questionnaire administered to both the treatment and control groups. The objectives were to examine the levels of integration and collaboration among MAT students and graduates with their counterparts in science education, and to identify social and cultural barriers that may inhibit collaboration.

The population for the treatment group consisted of all graduate students enrolled in the 1996-97 MAT agricultural education cohort at Oregon State University. Six students made up the 1996-97 MAT cohort. Due to the size of the population, all members of the cohort were included in the study. It is unfortunate that sample sizes were small for both the control and treatment groups. However, an examination of the mixed method approach can still be valuable since the emphasis of this paper is on the process and benefits of the research methodology used.

The subjects representing the control group, and involved only in the quantitative analysis of the study, were members of the previous five MAT agricultural education cohorts at Oregon State University, from 1991-92 through 1995-96, who were teaching Agricultural Science and Technology at the time the study was conducted. Because the nature of this paper is to examine a mixed method approach to data collection and interpretation, only the treatment group will be analyzed since they were the only group observed using both qualitative and quantitative methodology.

The treatment was administered in three phases during the 1996-97 academic year. Observations were timed to occur either during or after each phase of the treatment. During the 1996 fall term students were enrolled in a micro-teaching class. Students viewed sample agriculture lessons that included scientific principles, and were taught methods of integrating scientific principles into their own lessons. Then, the students themselves developed and delivered lessons that contained scientific principles within the agricultural context. Finally, students viewed the lessons of their cohort members that integrated science and had the opportunity to evaluate those lessons for content, delivery and methodology. Interview #1 took place during the 1996 fall term.

During the 1997 winter term, the teacher preparation cohort members were teaching at their student teaching sites. The student teachers were required to deliver a science-based lesson to an AST (Agricultural Science and Technology) class. In addition, they were required to establish contact with a science teacher in their building and observe that teacher in the classroom setting. Finally, the student teachers were required to borrow equipment and/or supplies from the science department for use in the agricultural classroom. Interview #2 occurred during the 1997 winter term.

During the 1997 spring term, members of the 1996-97 teacher preparation cohort were required to attend a one-week job shadowing/team-teaching experience at a nearby middle school in the state's largest metropolitan area. The teachers selected for observation and interaction were science/mathematics teachers from the metropolitan middle school. Interview #3 occurred during spring term of 1997 following the middle school experience.

The final data collection occurred in November/December of 1997 with a mailed questionnaire. The quantitative portion of the study involved a survey mailed to the participants in November of 1997. The purpose for the survey was to compare answers to questions

ERIC

concerning curriculum integration and collaboration between the treatment group and the control group. The questionnaire was developed by faculty members in the Agricultural Education Department at Oregon State University and based upon responses given during the audio taped interviews.

The mailed questionnaire consisted of three sections. Section one contained six statements concerning the integration of science into the agriculture curriculum. Teachers were asked to rate each statement concerning curriculum integration using an ordinal scale regarding *the importance* they placed upon the statement. A similar scale was used to determine their *level of involvement* with the contents of the statement (section 3). Section two featured a series of questions developed to determine the existence of social and cultural barriers between agriculture and science teachers. The quantitative questionnaire served as the comparison for the treatment and control groups involved in the pre-experimental, static group comparison model.

DISCUSSION

This study yielded two types of data. The first was in-depth, verbal responses which revealed the ongoing thought processes of the subjects undergoing treatment to become successful agricultural education teachers. The qualitative data revealed their perceptions of the importance, opportunities, and barriers present in collaborating with science teachers and their perceived ability to integrate science principles into the agriculture curriculum.

Secondly, the study produced data that revealed relationships and trends between the treatment and control groups. The quantitative results included frequency tables and means that compared the treatment and control groups in their desire to integrate science into their curriculum and their experiences with barriers that could prevent collaboration between disciplines. The following section provides a meta-analysis of the various responses given by the treatment group subjects to certain questions in the qualitative and quantitative instruments used in the study.

Table 1 displays the confidence level among the pre-service teachers concerning their ability to integrate science. Four out of the five (80%) indicated they were certain of their abilities to integrate science into the agriculture curriculum once they arrived at their schools using such words as "definitely" and "confident" that they could do the job.

Table 1
Confidence Levels of Student Teachers Concerning Their Ability to Integrate Scientific Principles Into the Agricultural Science and Technology Curriculum and Their Ability to Collaborate With Science Teachers (N=5)

Subject	**Do you feel confident that you can integrate scientific principles into your curriculum or collaborate with the science teacher at your new school?**
F1	Yes. Definitely.
F2	Yeah, I do. Definitely.
F3	It would depend on where I go and what I'm teaching.
F4	Yes. Definitely.
M1	Yeah. I feel confident that I can collaborate. I'm confident I will do my best to integrate science.

Table 2 illustrates the differences between the importance first year teachers placed on integration and collaboration efforts compared to their involvement in the same practices. In this section subjects felt strongly about the importance of integrating scientific principles into their agriculture curriculum. Comparisons can be made to the level of confidence they possessed during their student teaching practice and the acknowledged importance they placed upon this practice during their first year in the classroom.

Table 2
Perceptions of the 1996-97 Cohort Concerning the Importance Placed Upon Integrating Scientific Principles Into the AST Curriculum and Their Involvement in that Practice (N=4)

		Importance		Involvement	
Statement	N	Mean	SD	Mean	SD
AST (Agricultural Science and Technology) teachers should integrate scientific principles into their lessons	4	4.50	1.00	3.50	1.00
AST teachers should work with science teachers in their respective schools to assist in integrating scientific principles into the AST curriculum	4	4.25	0.50	2.75	0.96
Science teachers should assist AST instructors to incorporate scientific principles into the AST curriculum	4	3.75	0.50	2.25	0.96
AST teachers should share the resources of their programs with teachers in the science department	4	3.75	0.96	2.75	0.96
Science teachers should share the resources of their departments with the AST instructor	4	4.00	0.82	3.00	1.16
AST teachers should attend workshops on incorporating scientific principles into their curriculum	4	5.00	0.00	3.50	1.29

However, when analyzing the importance placed upon integrating science into their curricula and their confidence levels prior to becoming full-time agricultural science and technology teachers, it contradicts information in that same table (Table 2) which asked subjects to respond to their level of involvement in each of the statements. Individual responses to their level of involvement in integrating science were much lower than responses expressed for the importance the teachers placed upon integrating science. Not until information gathered from personal interviews concerning the time necessary to integrate science into their agriculture curriculum (Table 3) can conclusions be drawn regarding the disparity between their importance, confidence, and involvement in the integration of science into the agriculture curricula.

Table 3
Predictions of Agricultural Education Student Teachers Concerning the Timetable for Integrating Scientific Principles Into the Agriculture Curriculum and for Collaborating With Other Teachers Once They Begin Teaching (N=5)

Subject	**When would you predict that you would be willing to integrate and start thinking about ways to collaborate with other teachers?**
F1	Three to five years.
F2	Probably three to four years.
F3	At least the second, if not the third year.
F4	Three years.
M1	At least a year.

Further responses to the question in Table 3 included:

> *It's going to take three to five years to feel comfortable with what I'm doing so that I can feel comfortable enough to step out of my envelope and work with other teachers. I'll continue anything that the department has going, but beyond that I wouldn't want to start anything brand new. (F1)*
>
> *I think it would be a good three years before it was at least a, I don't want to say strong element, but a very visible element. And then, long term, I'd say five to six years before it was a strong element. I don't want to say 'yeah, I'm going to do it in the first year.' Wrong! I don't think that's feasible. (F4)*
>
> *Factors that come into play are: The subject you're teaching, facilities, budget, how willing the science teachers are to collaborate. I would say at least a year. If I just do not have the resources, I don't see myself throwing that much time in that direction when I'm just trying to get through the year. Maybe I'm just freaking out too much about how stressful the first year's going to be, but if the things aren't there then I'm not going to put too much effort in. (M1)*

Not having the information obtained in the personal interviews concerning the time anticipated to integrate science would have left the researchers asking themselves what went wrong in this research project. Teachers said it was important, and furthermore they felt confident they could do it. However, in reality not much integration was taking place. Why? Once the answers to the interview questions were analyzed and taken into account it became apparent. The treatment activities had the desired effect: the student teachers had a positive

attitude toward science integration into the agriculture curriculum and felt positive about, and confident in, their ability to collaborate with science teachers. It should be realized, however, that collaboration will likely start after year two or three, rather than at year one. Integration was perceived as important, but other things had to come first.

CONCLUSIONS

The purpose of this manuscript was to determine how using a mixed method approach that combined quantitative and qualitative research methodologies affected the interpretation and presentation of results in a study focused on agricultural education teacher preparation. Most research conducted and published concerning Agricultural Education Teacher Preparation is of quantitative design. Although arguments can be made extolling the virtues of both qualitative and quantitative methodology, a combined approach allows the researcher a look into a level of observation that is difficult to obtain using a single method of inquiry.

In the above study it was discovered that although pre-service teachers were confident in their ability to integrate science into their curricula and, once they began teaching they continued to believe it was important to the overall effectiveness of their program, they were not as involved in the process as the researcher would have thought. Why? As the information from personal interviews conveyed, four out of five indicated it would take three years before they would be able to turn their attention to the integration of science.

Had it not been for the combined approach to the research questions valuable information would have been deleted causing different results and improper conclusions to the study. As a result, the researchers can focus further efforts toward the integration of science into the agriculture curricula with attempts to shorten the lag time necessary for implementation of this practice among new and beginning teachers. Therefore, one benefit observed is a refined ability to focus on more appropriate application of the research results obtained.

It should be noted that mixed-method evaluations, although valuable, are not without drawbacks. Additional time is necessary to implement a design utilizing more than one methodology. Researchers accustomed to the quick turnaround of some quantitative studies may be dismayed by the time required to interpret and evaluate qualitative data. It is most likely that additional staff will be required to verify conclusions from qualitative data and make accurate conclusions.

Furthermore, it is recommended that researchers with different specialties in research methodology be recruited to collaborate in the mixed method approach. For example, researchers competent in ethnographic studies should partner with faculty experienced in quantitative studies. The vast array of skills needed to properly conduct a mixed method evaluation dictates that researchers with different strengths pool their knowledge to design and implement the various methodologies.

Finally, the results of a mixed method evaluation can be contradictory. Results for the qualitative piece may be incompatible with the quantitative findings. Having incongruent results may be unsettling to researchers. However, having a richer model, one comprised of both qualitative and quantitative methods, will allow researchers to further examine the evidence and

ERIC Full Text Provided by ERIC

allow for conclusions and recommendations which may be more accurate than using a single method approach.

Recent change in Agricultural Education and teacher preparation has been abundant. It is important that we as educators of future teachers take a closer look and evaluate the methods used to add to the body of knowledge of our profession. This paper used a case study to highlight the experienced benefits involved in using a mixed method research design. Further study is needed to advance this methodology and develop clear conceptual and operational guidelines for mixed method research to be useful for agricultural education teacher preparation faculty.

ERIC Full Text Provided by ERIC

REFERENCES

Campbell, M. & Martin, R. (1992). Qualitative research as a tool for agricultural and extension education. Journal of Agricultural Education, 33 (4), 55-60.

Denzin, N. K. & Lincoln, Y. S. (1994). Introduction: Entering the field of qualitative research. In N. K. Denzin & U.S. Lincoln (Eds.), Handbook of qualitative research. Thousand Oaks, CA: Sage.

Gall, M. D., Borg, W. R. & Gall, J. P. (1996). Educational research: An introduction (6th ed.). White Plains, NY: Longman Publishers USA.

Strauss, A. L. & Corbin, J. M. (1990). Basics of qualitative research: Grounded theory procedures and techniques. Newbury Park, CA: Sage Publications, Inc.

Reichardt, C. S. & Rallis, S. F. (1994). The qualitative-quantitative debate: New perspectives. San Francisco, CA: Jossey-Bass Publishers.

Waysman, M. & Savaya, R. (1997). Mixed Method Evaluation: A Case Study. Evaluation practice, 18 (3), 227-237.

AN ANALYSIS OF A COMBINED QUANTITATIVE/QUALITATIVE APPROACH FOR CONDUCTING RESEARCH IN AGRICULTURAL EDUCATION

A Critique

Sharon B. Stringer
Pennsylvania State University

The researchers who completed this project were quite ambitious to investigate the use of a combined quantitative/qualitative approach to agricultural education research. Using qualitative research scholars such as Denzin and Lincoln (1994), they established a case for applying naturalistic research methods to agricultural education.

The application of dual research techniques to traditional research activities is complex and is illustrated by the numerous considerations relevant to critiquing such a project. Can traditional evaluation techniques be applied to multi-faceted research procedures? Let's begin by discussing duality as it is applied to evaluating the research questions.

The objective of research question number one is to solicit pre-service agricultural education teachers for the "need felt." Can "need felt" be determined by both qualitative and quantitative measures? Or, is it more appropriate and sometimes necessary to state two different research questions, using syntax that can be most effectively interpreted by a specific research method (quantitative or qualitative)?

The presentation of the methodology is another consideration. As the utility of any research is maximized by its clear and thorough description, this researcher suggests that a mixed method approach must be richly defined. Given that information relevant to the reliability of the instrument, values used in the instrument's ordinal scale, and both qualitative and quantitative summaries for questions were not provided, a more manageable presentation of the findings might be considered. For researchers considering qualitative and quantitative analysis of a project, maybe separate presentation of the findings are most effective. A combined analysis approach makes it difficult to present all the necessary information allotted by traditional presentation outlets.

The researchers indicate that the study yields two types of data. Does that mean that there was quantitative and qualitative interpretation for each question? If so, why did the authors opt to present the findings using either of the two techniques? Is it too cumbersome to present both?

Nonetheless, most would agree that the quantitative/qualitative approach provides credibility to the research findings. Findings determined by one method are either validated or invalidated by the other. Even when mixed method evaluation reveals contradictory results, the researcher can learn valuable information. In many cases, the researcher will know that the project needs to be replicated to insure credibility to conclusions proposed.

This researcher suggests that a study is completed and then replicated using a different evaluation technique for each procedure. The first attempt at the project could be evaluated using

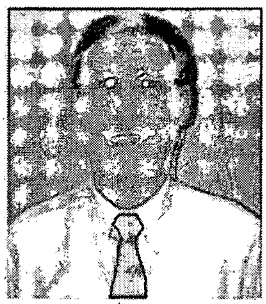
quantitative methods and the second experiment could use qualitative. Of course, this is an optimum solution.

All things considered, however, it is appropriate for the researchers to have considered non-traditional practices in evaluation methods for agricultural education. If agricultural educators are to sustain their credibility in the academic arena, innovative practices must be applied to agricultural research activities. Furthermore, each new research project strengthens the literature and establishes a benchmark for additional investigation. As suggested by the authors of this project, further research will help to develop clear operational guidelines for the use of mixed method evaluation.

NAERC '99

Fresh Florida

A Descriptive Study on University Agricultural Education Programs in Preparing Faculty and Students to Work with Diverse Populations



Dexter Wakefield
Purdue University

B. Allen Talbert
Purdue University

INTRODUCTION

The United States is a diverse society in terms of culture, geography, ethnicity, and socio-economic status. In 1988, the National Research Council stated the enrollment of secondary agriculture had traditionally been mainly White males and that it continued to be that way. Although female enrollment increased during the 1980s, minority enrollment remained low. In The Strategic Plan for Agricultural Education, the National Council for Agricultural Education (1989) set as a priority goal of agricultural education, "To serve all people and groups equally and without discrimination" (p.4). This call for action applies equally to collegiate agricultural education programs as to secondary programs. Increasingly, Americans must be able to work with people whose culture, language, or frame of reference is different from their own. Agricultural education faculty and students have a responsibility to be prepared to work in diverse situations.

ERIC

In 1991, the Population Diversity Work Group of the American Association for Agricultural Education (AAAE) surveyed university agricultural education departments in the United States (Bowen, B. E., Gonzalez, M., Norland, E., Schumacher, L. G., Vaughn, P., & Whent, L., 1991) to determine what strategies were being used to recruit and retain students from diverse populations. In 1993, the AAAE Population Diversity Work Group published a monograph titled Enhancing Diversity in Agricultural Education (Bowen, 1993). The articles included topics on impediments to diversity, model programs for diversity, and faculty mentoring programs. At the 1995 AAAE Population Diversity Work Group meeting in Denver, Colorado the group discussed developing a second monograph on mentoring, recruitment, retention, and placement (L. Whent, personal communication, August 23, 1996). This current study was conducted as a result of the 1995 work group meeting.

THEORETICAL FRAMEWORK

America's classrooms have always been diverse in terms of ethnicity, socio-economic status, gender, and other variables. What has changed in recent years is that teachers and others can no longer ignore these differences, and in fact are being challenged to embrace pluralism and multiculturalism (Greene, 1995). Grant (1978) stated one purpose of education was to prepare individuals to live and work in an ethnically and culturally diverse society. Ogbu (Gibson & Ogbu, 1991; Ogbu, 1978) theorized that type of minority status and type of cultural differences is critical in understanding the interaction of minority students and the educational system. Three types of minorities exist: 1) autonomous, which are minorities in a numerical sense such as Jews, 2) voluntary, people who moved to the United States for economic opportunities or political freedom such as Asians, and 3) involuntary, people who were brought into the U.S. society against their will through means such as slavery. Ogbu stated involuntary minorities usually experience greater and more persistent difficulties in the educational system. He went on to theorize that cultural differences could be divided into primary and secondary differences. Primary cultural differences are those that existed before two groups come into contact and secondary are those that arise after the groups come into contact. He stated these secondary differences seem to cause the most ambivalence and conflict within the majority culture.

Banks and McGee Banks (1989) provided a history of the reactions and actions of educational systems to demands to include greater cultural diversity in the curriculum. After the flurry of political and social activities of the civil rights movement, educational institutions put together courses and programs to address ethnic and cultural diversity. However, these tended to be poorly planned and unsystematic. The courses developed on the collegiate level tended to be electives, which were only taken by members of the minority group that was the subject of the course. In the 1970s, other minority groups, such as women, in addition to ethnic groups were added to the list of courses and programs. In the 1980s, the term "multicultural education" began to be used to define debate in this area, to move to a discussion on educational reform, and to develop educational processes.

PURPOSE AND OBJECTIVES

This study was conducted to determine the degree to which agricultural education programs are preparing their faculty and students to work with diverse populations. This census study should give the profession a snapshot in time of the courses and research of collegiate level agricultural education programs.

The specific objectives of the study were to:

1. Describe the courses and experiences agricultural education programs provide to students in preparing them to teach or work in cultural and gender diverse environments.
2. Determine the extent to which agricultural education programs are infusing diversity, multiculturalism, and pluralism into their curriculum.
3. Determine the extent to which the agricultural education program or the state agricultural education staff provides workshops or graduate education courses on diversity for teachers.
4. Describe how new and current agricultural education faculty members are provided experiences enabling them to prepare college students to teach in the diverse society.

METHODOLOGY

A census was conducted using a mailed questionnaire to all Agricultural Education programs in the United States. The target population was the 93 universities with agricultural education programs as identified in the Directory of Agricultural Education published annually by the American Association for Agricultural Education (AAAE). The questionnaire was researcher-developed using guidelines from the 1995 meeting of the Diverse Populations Work Group of AAAE. Prior to mailing, the questionnaire was reviewed for content and clarity by a panel of experts at Purdue University composed of agricultural education faculty, faculty teaching multicultural education, and members of the Department of African American Studies.

The final questionnaire used to collect data was mailed in the spring of 1998 to the 93 Agricultural Education Heads listed in directory. If a Department Head was not listed or the listed person was not in Agricultural Education, then the questionnaire was mailed to an appropriate person in Agricultural Education at the university. Follow-up included a second mailing, telephone calls, and email contacts. By July 1998, 56 out of 93 Agricultural Education programs had responded giving a 60% response rate. Three of the respondents stated their university no longer offered Agricultural Education, so the final useable response rate was 53 out of 90 (59%). Data were analyzed using Statistical Package for the Social Sciences. Descriptive parameters, including frequencies and percentages, were used to analyze data.

Questionnaire

The agricultural education programs were surveyed using a six-section questionnaire. Section one, Formal Coursework, included four questions designed to discover what types of preparation and experiences were provided for agricultural education undergraduate students to teach or work in diverse situations (ethnicity, gender, and geography). Section two, Infusion, included six questions designed to discover the extent to which agricultural education programs were infusing classes in diversity, multiculturalism, pluralism, special needs learning and field experiences into their curriculum. Section three, Institutional Adjustment, included seven questions designed to discover the extent to which agricultural education programs were providing experiences and preparation as in-service or graduate education for agricultural education teachers to teach or work in diverse situations. The agricultural education programs were asked to provide information to whether their department/institution provided services and/or whether the State's Agricultural Education staff provided services where applicable. Section four, Research, included four questions designed to discover what types of research projects were conducted on teaching and working in diverse situations by the faculty and graduate students. Section five, Faculty Preparation toward Diversity Issues, included six questions designed to discover what types of experiences and preparation were provided for new and current faculty to teach diverse college students and to prepare those students to teach or work in diverse situations. Section six, Demographic Make-up, was designed to discover the racial and gender percentages of the faculty and student body in agricultural education. Section six will not be reported in this paper as non-responding Agricultural Education programs may differ from responding programs and the researchers believe that some universities reported school-wide numbers rather than agricultural education program numbers.

FINDINGS/RESULTS

Coursework for Undergraduates

Thirty-two (64 %) agricultural education programs stated they require diversity classes for undergraduates (Table 1). In addition, 16 (35.6%) agricultural education programs stated their department or university offered classes in diversity as optional/elective courses. Of the 49 agricultural education programs that responded, 45 (91.8%) stated they offered topics in diversity that are infused into some/all of their agricultural education courses.

ERIC Full Text Provided by ERIC

Table 1
Diversity Coursework for Agricultural Education Undergraduates. *(N=53)*

	Response Percentage	Frequency	
Required Courses			
	Yes	32	64.0
	No	18	36.0
	Total	50	100.0
Elective/Optional Courses			
	Yes	16	35.6
	No	29	64.4
	Total	45	100.0
Topics Infused into Agricultural Education Courses			
	Yes	45	91.8
	No	4	8.2
	Total	49	100.0

Thirty-two (64%) agricultural education programs stated they require their undergraduates to take a course in Special Needs Learners (Table 2). In addition, 14 (32.6%) agricultural education programs stated their department or university offered courses for Special Needs Learners as optional/elective courses. Of the 50 agricultural education programs that responded, 47 (94%) stated they offered topics in special needs learners that are infused into some/all of their agricultural education courses.

Table 2
Coursework in Special Needs Learners for Agricultural Education Undergraduates. (N=53)

	Response Percentage	Frequency	
Required Courses			
	Yes	32	64.0
	No	18	36.0
	Total	50	100.0
Elective/Optional Courses			
	Yes	14	32.6
	No	29	67.4
	Total	43	100.0
Topics Infused into Agricultural Education Courses			
	Yes	47	94.0
	No	3	6.0
	Total	50	100.0

Field Experiences for Undergraduates

For 25 (50%) of the 50 agricultural education programs that responded, early field experiences are conducted at schools with a large diverse population (Table 3). Table 3 also shows that 22 (44%) place student teachers at schools with a large diverse population. There were 19 agricultural education programs (38.8%) that stated non-teacher education options were not a part of their programs. There were 16 (32.7%) that have field experiences or internships for non-teacher education students at locations with a large diverse population.

Table 3
Field Experience Conducted at Schools with a Large Diverse Population. (N=53)

	Response Percentage	Frequency	
Early Field Experiences			
	Yes	25	50.0
	No	22	44.0
	Maybe	3	6.0
	Total	50	100.0
Student Teacher Placements			
	Yes	22	44.0
	No	23	46.0
	Maybe	5	10.0
	Total	43	100.0
Field Experiences/Internships for Non-teacher Education Students			
	Yes	16	32.7
	No	11	22.4
	Not applicable	19	38.8
	Maybe	3	6.1
	Total	50	100.0

In-service and Graduate Experiences Provided by Agricultural Education Programs

In graduate education, 27 (56.3%) agricultural education programs stated either they or their university offered graduate courses in diversity, pluralism, or multiculturalism (Table 4). Eleven (31.4%) stated their department or university offered graduate courses on Special Needs Learners. Six (17.1%) said this question did not apply to their university. There were 27 (58.7%) agricultural education programs that provide graduate seminars in diversity topics. Table 4 also shows that 21 (45.7%) agricultural education programs provide workshops in Special Needs Learners. There were 23 (47.9%) agricultural education programs that provide workshops in diversity, pluralism, or multiculturalism.

Table 4
In-service and Graduate Coursework in Diversity and Special Needs Learners. (N=53)

	Response Percentage	Frequency	
Graduate Course in Diversity, Pluralism, or Multiculturalism			
	Yes	27	56.3
	No	21	43.7
	Total	48	100.0
Graduate Course on Special Needs Learners			
	Yes	11	31.4
	No	18	51.4
	Not applicable	6	17.1
	Total	43	100.0
Graduate Seminars in Diversity Topics			
	Yes	27	58.7
	No	19	41.3
	Total	46	100.0
Workshops on Special Needs Learners			
	Yes	21	45.7
	No	24	52.2
	Maybe	1	2.2
	Total	46	100.0
Workshops on Diversity, Pluralism, Multiculturalism			
	Yes	23	47.9
	No	24	50.0
	Maybe	1	2.1
	Total	48	100.0

In-service and Graduate Experiences Provided by State Agricultural Education Staff

Four (11.8%) agricultural education programs responded that their State's Agricultural Education Staff provided seminars or workshops in diversity topics (Table 5). Seven (20.6%) responded that this question did not apply to their state. Thirty (62.5%) agricultural education programs responded that their State's Agricultural Education Staff provided workshops on Special Needs Learners.

Table 5
Seminars and Workshops in Diversity and Special Needs Learners Provided by State Staff. (N=53)

	Response	Frequency	Percentage
Seminar/Workshop in Diversity, Pluralism, or Multiculturalism			
	Yes	4	11.8
	No	23	67.6
	Not applicable	7	20.6
	Total	34	100.0
Seminar/Workshop on Special Needs Learners			
	Yes	30	62.5
	No	18	37.5
	Total	48	100.0

Research

There were 20 (47.6%) agricultural education programs that have faculty members who conducted research on gender issues (Table 6). Table 6 also shows that 15 agricultural education programs (36.6%) have faculty members who conducted research on ethnicity and race issues. Another 14 (35%) have faculty who conducted research on special needs learners. Table 6 also shows that 22 agricultural education programs (53.7%) have faculty that conducted research on non-traditional students.

There were 19 (48.7%) agricultural education programs that have graduate students who conducted research on gender issues (Table 6). Table 6 also shows that 16 agricultural education programs (41%) have graduate students who conducted research on ethnicity and race issues. Another 14 (36.8%) have graduate students who conducted research on special needs learners. Table 6 also shows that 18 agricultural education programs (47.4%) have graduate students that conducted research on non-traditional students.

Table 6
Research Conducted on Diversity and Special Needs Learners. (N=53)

Students	Response Percentage	Conducted by Faculty Members Frequency	Percentage	Conducted by Grad. Frequency	
Gender Issues					
	Yes	20	47.6	19	48.7
	No	22	52.4	20	51.3
	Total	42	100.0	39	100.0
Ethnicity/Race Issues					
	Yes	15	36.6	16	41.0
	No	26	63.4	23	59.0
	Total	41	100.0	39	100.0
Special Needs Learners					
	Yes	14	35.0	14	36.8
	No	26	65.0	24	63.2
	Total	40	100.0	38	100.0
Non-traditional Students (Geography, Rural/Urban, etc.)					
	Yes	22	53.7	18	47.4
	No	19	46.3	20	52.6
	Total	41	100.0	38	100.0

Faculty Preparation toward Diversity

Table 7 shows that less than one-fourth of the universities provided mandatory departmental/institution workshops in diversity, multiculturalism, or pluralism to new or current faculty. A majority of the universities do provide optional departmental/institution workshops in diversity, pluralism, or multiculturalism to their new and current faculty. Table 7 also shows that less than one-half of the universities reported providing faculty meeting presentations on diversity for their new or current faculty. Less than 10% provided a faculty retreat with a focus or session on diversity to their new faculty or current faculty. Greater than three-fourths of the universities reported they did provide diversity statements to their new and current faculty and encouraged the use of these statements on correspondences and publications. A majority also reported they encouraged diversity as a topic for individual studies or research to their new and current faculty.

ERIC Full Text Provided by ERIC

Table 7
Faculty Preparation on Diversity by Department or Institution. (N=53)

	Response	Frequency	Percentage	Frequency	Percentage
Faculty		Provided for New Faculty		Provided for Current Faculty	
Mandatory Workshop					
	Yes	11	23.9	10	21.3
	No	35	76.1	37	78.7
	Total	46	100.0	47	100.0
Optional Workshop					
	Yes	28	59.6	30	63.8
	No	17	36.2	15	31.9
	Maybe	2	4.3	2	4.3
	Total	47	100.0	47	100.0
Faculty Meeting Presentation					
	Yes	19	40.4	22	45.8
	No	28	59.6	26	54.2
	Total	47	100.0	48	100.0
Faculty Retreat					
	Yes	4	8.5	4	8.5
	No	43	91.5	43	91.5
	Total	47	100.0	47	100.0
Statements Encouraged in Correspondences, Publications, etc.					
	Yes	36	76.6	36	76.6
	No	11	23.4	11	23.4
	Total	47	100.0	47	100.0
Research/Individual Studies on Diversity as a Topic Encouraged					
	Yes	29	63.0	29	63.0
	No	17	37.0	17	37.0
	Total	46	100.0	46	100.0

Qualitative Comments on Diversity and Special Needs Learner Preparation

Respondents wrote comments, which provided greater details on certain questions. When asked to provide course titles for required courses in diversity, the most frequent responses given were "Multicultural Education" (14) and "Cultural Diversity and Education" (10). When asked to provide course titles for optional courses in diversity, the most frequent responses given were "Education of Exceptional Learners/Special Needs" (10), "History (Black, American Indian, Women's Issues)" (5), and "Multicultural Education" (3). When asked to provide course titles for required courses in special needs learners, the most frequent responses given were "Special

Needs/Education" (12) and "The Exceptional Child" (10). When asked to provide course titles for optional courses in special needs learners, the most frequent responses given were "Special Needs/Special Education" (6) and "Exceptional Learners" (2). One respondent commented that although "...some emphasis [in special needs] is needed in the preparation program...this cannot be at the expense of technical course work. A balance is needed."

When asked to provide course titles for agricultural education courses in which diversity as a topic is infused, the most frequent responses given were "Methods Courses" (23), "Program Planning" (10), "Introduction to Agricultural Education" (10), and "Leadership Development" (7). One respondent commented on the lack of schools with diverse populations in which to place students. They wrote "Many of the schools in our region that have agriculture programs do not have a large percentage of minority students. In fact, most of the schools including those with agriculture programs do not have a large percentage of minority students. So therefore, ... it is not that we don't place them in schools with large percentages of minorities, but that the large percent of minorities is not there in the schools. Our desire is to place them in experiences with greater diversity." Another respondent who stated "Many of our schools that welcome observation students are rural schools from around the state and have few minorities simply because of geographic location" echoed this concern. Two respondents provided solutions to this problem. One stated "Agricultural Education seniors are required to observe 25-40 hours in an urban school setting." This is similar to another statement "Students complete volunteer projects in area organizations as part of youth organizations course." Another defined diversity as such "Our enrollment is multicultural: 1/3 female, 1/2 rural, 1/3 graduate (add-on certification to other agriculture major). We seek diversity in our recruitment activities. This means purposeful efforts to locate and recruit diverse students."

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

This exploratory study was an initial attempt to gauge the degree to which agricultural education programs were preparing their faculty and students to work with diverse populations. Because of the response rate of 59 percent, caution should be exercised in extrapolating the results to non-respondents. However, the researchers believe that because this was a census study and due to the nature of the topic, recommendations can be made for the entire population.

Agricultural education undergraduate students in the United States are receiving instruction on diversity, multiculturalism, and pluralism whether through required courses, optional courses, or infusion of these topics into agricultural education courses. What is uncertain is the level of dialogue provided by these experiences. Are students reaching the level of understanding described by Banks and Banks (1989) where discussion on reform and processes can take place? In addition, only one-half are receiving early field experiences in settings with students different than themselves and less than one-half are student teaching or doing internships in these settings. It is recommended that undergraduate students in agricultural education receive preparation on diversity that prepares them to go beyond a knowledge level of diversity to a process level. All students should be involved in early field experiences in settings where agricultural education undergraduates interact with people different than themselves. The same should apply for professional experiences as much as possible. This recommendation assumes a broad definition of diversity to include ethnicity, gender, geography, rural/urban, and socio-economic status.

ERIC

Agricultural education undergraduate students in the United States are receiving instruction on special needs learners whether through required courses, optional courses, or infusion into agricultural education courses. Again, the unanswered question is whether students are receiving only knowledge of laws and characteristics or are learning to effectively teach students with special needs. It is recommended that a follow-up study be conducted on recent graduates of agricultural education programs to determine the proficiency with which they are working with special needs learners. This follow-up study should also investigate the degree to which recent graduates of agricultural education programs are preparing their students to live and work in an ethnically and culturally diverse society as recommended by Grant (1978).

Only about one-half of agricultural education programs provide graduate students instruction in diversity. Less than one-half provide instruction on special needs learners to graduate students. A little more than one-tenth of the respondents said their state agricultural education staff provided seminars or workshops on diversity, and approximately two-thirds provide seminars/workshops on special needs learners. One implication is that while undergraduate students are receiving instruction and experiences in these areas, existing teachers and graduate students are not. If only new entrants are prepared to work with diverse populations, then there is the risk that these new entrants will be socialized into the current system. Therefore, more must be done to educate existing teachers and workers.

Approximately one-half of the responding institutions reported faculty members and graduate students conducting research on gender issues. Approximately 40 percent reported faculty members and graduate students conducting research on ethnicity/racial issues. About one-third reported faculty members and graduate students conducting research on special needs learners. This finding contradicts the number of research papers (32 out of 701) presented at the National Agricultural Education Research Meeting during the past 25 years on these topics as reported by Radhakrishna (1998). Is there a wealth of research information specific to agricultural education in the areas of gender, ethnicity, and special needs that has not been published? This question needs further research to explore the reasons for the lack of publications in these topic areas.

Less than one-fourth of responding institutions reported new and current faculty members are required to attend a workshop on diversity. Less than one-half conduct a faculty meeting presentation on diversity and less than 10 percent conduct a faculty retreat on this issue. Although a majority reported optional workshops on diversity are available, it is unknown how many faculty members attend the workshops. If, as concluded above, agricultural education graduate programs are not adequately preparing students for diversity and if new and current faculty members are not receiving adequate preparation, then it can be concluded that the faculty in agricultural education needs instruction and experiences in diversity. Therefore, it is recommended that the American Association for Agricultural Education (AAAE) further explores this issue and if necessary provides avenues to remedy deficiencies.

REFERENCES

Banks, J. A., & McGee Banks, C. A. (Eds.). (1989). Multicultural education: Issues and perspectives. Needham Heights, Massachusetts: Allyn and Bacon.

Bowen, B. E. (Ed.). (1993). Enhancing diversity in Agricultural Education. University Park, PA: Pennsylvania State University, Department of Agricultural and Extension Education, Population Diversity Work Group of the American Association for Agricultural Education.

Bowen, B. E., Gonzalez, M., Norland, E., Schumacher, L. G., Vaughn, P., & Whent, L. (1991, December). Recruitment, retention, and career enhancement strategies utilized with underrepresented groups. Committee report prepared for the American Association for Agricultural Education.

Gibson, M. A., & Ogbu, J. U. (Eds.). (1991). Minority status and schooling: A comparative study of immigrant and involuntary minorities. New York: Garland.

Grant, C. A. (1978). Education that IS multicultural-isn't that what we mean? Journal of Teacher Education 29(5), pp. 45-48.

Greene, M. (1995). Releasing the imagination: Essays on education, the arts, and social change. San Francisco: Jossey-Bass.

National Council for Agricultural Education. (1989). The strategic plan for agricultural education: A national mobilization plan for revolutionary change in agricultural education. Washington, DC: National Summit on Agricultural Education.

National Research Council. (1988). Understanding agriculture: New directions for education. Washington, DC: National Academy Press.

Ogbu, J. U. (1978). Minority education and caste: The American system in cross-cultural perspective. New York: Academic Press.

Radhakrishna, R. (1998). 25 years of National Agricultural Education Research Meeting: Analyzing the past to discover future research priorities. Proceedings of the 25th National Agricultural Education Research Meeting, 25. New Orleans, Louisiana. pp. 551-563.

ERIC

A DESCRIPTIVE STUDY ON UNIVERSITY AGRICULTURAL EDUCATION PROGRAMS IN PREPARING FACULTY AND STUDENTS TO WORK WITH DIVERSE POPULATIONS

A Critique

Sharon B. Stringer
Pennsylvania State University

Given the changing demographics of the American population, it is appropriate for the authors to address to what extent agricultural education programs infuse diversity into their curriculum. The authors adequately present an introduction, establishing a need for the study. The theoretical framework identifies three types of minorities ; 1) numerical minorities such as Jews, 2) voluntary immigrants such as Asians, and 3) involuntary immigrants such African Americans.

However, no effort is made to include people of various learning abilities in the literature review. Nonetheless, special needs learners are included in the data. Is it the norm among universities to include special needs curriculum as part of diversity or pluralism? Operational definitions of diversity, pluralism and multiculturalism would have augmented clarity for the reader. Some universities may consider international courses as part of their multiculturalism efforts, for example, while others do not.

The authors clearly define the purpose and objectives and provide an effective segue to the methodology section. Would it have been appropriate for the researchers to describe the requirements that agricultural education programs have relevant to diversity as well as the courses and experiences they provide as an objective?

The methodology section left this reader with some unanswered questions. When a department head was not listed in the Directory of Agricultural Education (edition unidentified) the researchers indicated that they sent the questionnaire to an appropriate person. Who is an appropriate person? Was it sent to another department head, a dean, or a faculty person? How was that person identified?

The researchers provide an extensive paragraph about the questionnaire. The content and face were properly established. However, no explanation of its reliability is offered. Nor is there indication of the type of questions included (e.g. Likert -type, open-ended, etc.). In addition, no controls for nonresponse error were made. Could non-respondents have been compared to respondents on demographics? The researchers indicated that they believe that some respondents reported school-wide numbers rather that agricultural education program numbers. That assertion establishes the character of the researchers but leaves the findings suspect.

An appropriate explanation of the finding are presented in the tables. However, further examination of the findings may increase perspective on agricultural education programs in the study. For example, with a less than .3 variation, between course work for diversity and course work for special needs learners, it appears that agricultural education programs address the issues similarly.

The researchers are wise not to generalize their finding to the population. Appropriate conclusions are drawn from the findings. Agricultural education programs include diversity, multiculturalism, pluralism and special needs instruction to their undergraduate and graduate students. However, many do not.

The researchers are to be commended for their investigation of such an appropriate topic. While they have provided the framework for increased focus on preparing faculty and students to work with diverse populations, no recommendation is offered relative to how administrators will enforce such initiatives. This author suggests that unless educational programs directed at diversity and pluralism are recognized as necessary additions to faculty portfolios, many avenues to remedy deficiencies in this area will remain unexplored.

Perceived Level of Teaching Skills and Interest in Teaching Improvement Among Faculty in a Land-Grant College of Agriculture

George Wardlow
University of Arkansas

Donald Johnson
University of Arkansas

INTRODUCTION

Public opinion appears to have resulted in a renewed interest in the quality of teaching in America's college classrooms. Articles in the popular press, legislative hearings, and radio talk show "experts" each have called for efforts to improve instruction in higher education. Concomitant to this interest, those involved in delivering college-level instruction in agriculture, faculty members and administrators alike, are placing new emphases on quality teaching (Board on Agriculture, National Research Council, 1992).

The primary clients of higher education, the students, consider teaching as the most important function of the faculty member. In a study of students at 17 institutions, Wiedmer (1994) reported that 96 % believed that teaching was the most important job of the professor, followed by service and then research.
However, the importance of teaching to the mission of the land-grant college has yet to become a major influence in faculty personnel decisions. Ernest Boyer, in Scholarship Reconsidered (1990), noted that the commonly held view of being a scholar is being a researcher, and that publication is "the primary yardstick by which scholarly productivity is measured" (p. 2).

ERIC

Boyer (1990) called on American higher education to redefine scholarship from an exclusive focus on conducting and publishing research to a broader view, which includes the scholarship of teaching.

> Surely, scholarship means engaging in original research. But the work of a scholar also means stepping back from one's investigation, looking for connections, building bridges between one's theory and practice, and communicating one's knowledge effectively to students. (p. 16)

While the improvement of teaching may be an accepted goal for colleges and universities, Jackman and Swan (1995) have suggested that faculty must be intrinsically motivated to improve their teaching performance. They declared that intrinsic motivation results in faculty who are more committed to improving their instructional skills. However, Boyer's (1990) view of teaching as a component of scholarship equal to research includes equal rewards for both functions. These rewards include promotion, tenure, and salary considerations.

In spite of the recent interest in the importance of teaching, little training is provided for instructors (Simerly, 1990). Ely and Ragland (1989) noted that the graduate education required to become a university faculty member is generally devoid of instruction in teaching.

> At every level of education, except the university, instructors are trained to teach and must become certified to do so. We train M.S. and Ph.D. candidates for two to five years to conduct research, but in general, we do not train them to teach. (p. 43)

Lowman (1995) also noted that few college teachers receive formal instruction in how to present intellectually exciting lectures, to lead engaging discussions, or to relate to students in ways that promote motivation and independent learning. Boyer (1990) cited a written comment on a questionnaire by a professor of mathematics at a comprehensive university, "It is assumed that all faculty can teach, and hence that one doesn't need to spend a lot of time on it. Good teaching is assumed, not rewarded" (p. 32).

Some authors have called for more emphasis on training in teaching in graduate education programs. Bowman, Loynachan, and Schafer (1986) stated that,

> Teaching is one of the most important activities of a college professor. Completing M.S. and Ph.D. degrees should make one professionally competent in his or her technical field, but this may not be adequate preparation for teaching. (p. 96)

In a study of agriculture faculty at the University of Idaho, 79 % felt that participating in a teaching methods course would improve their teaching (Pals, 1988). Over 50 % felt that they could use assistance in improving their skills in several traditional teaching areas.

The increasing use of educational technology places additional demands on faculty members. Kirby, Waldvogel, and Overton (1998) studied agriculture faculty at North Carolina State University to determine their level of skill and in-service needs related to educational technologies. Faculty members in this study expressed a need for instruction in educational technologies such as multi-media formats, web page construction, and computer and presentation graphics.

How do college faculty members view their own abilities and interests in teaching? What are their levels of teaching skills and what types of teaching improvement strategies are they most interested in learning more about? Identifying the needs of college faculty with regard to their teaching skills is critical to developing a staff development plan to assist them in improving. According to Engleberg (1991), "Needs assessment is the essential first step in developing an effective staff development plan" (p. 221).

PURPOSE OF THE STUDY

This study was conducted as a part of a needs assessment for a U.S.D.A. grant to improve instruction in agriculture. Specifically, the study sought to determine the perceptions held by teaching faculty in a land-grant college of agricultural, food and life sciences about their skills in selected teaching activities and use of educational technologies, and their interest in learning more about selected teaching activities and technologies. The following research questions were posited to guide the study:

1. What are the perceptions of faculty members about their level of skills in selected teaching activities?
2. What level of interest do faculty members have in learning more about selected teaching activities?
3. What are the perceptions of faculty members about their level of skills in the use of educational technologies?
4. What level of interest do faculty members have in learning more about the use of educational technologies?
5. What is the relationship between faculty members' perceived levels of skill and interest in learning more about both teaching activities and educational technologies?
6. What are the relationships between the faculty members' levels of interest in learning more about teaching activities and technologies, and their teaching-related demographics?

METHODS

This was a census study of teaching faculty in the College of Agricultural, Food and Life Sciences at the University of Arkansas. A list of all current faculty members was obtained from the dean's office. Departmental administrative assistants helped to identify those faculty members who had taught one or more courses within the previous two years. A total of 138 faculty members was identified and included in the study. Completed surveys were returned from 113 faculty members after two mailings for an overall response rate of 81.9 %. Responses were received from all departments, with the departmental response rates ranging from 67% to 100%.

Data were collected using a survey instrument which required respondents to rate both their self-perceived "current level of skill" and their "level of interest in learning more" about two categories of teaching items: **teaching activities** (20 items) and **educational technologies** (12 items). The instrument also included five questions concerning the respondents' teaching appointment and experience. The instrument was based, in part, on an instrument by Baker, Hoover, and Rudd (1996).

ERIC

The instrument was reviewed by a panel of teaching faculty members representing each department in the college to assess content validity. It was determined to be valid. A test-retest procedure was employed using 11 graduate students in a College Teaching course at a four week interval to establish a coefficient of stability ($\underline{r} = 0.68$).

Following data collection, a factor analysis (oblique rotation) was performed on the instrument to assess construct validity. An item was said to load on a given factor if the factor loading was 0.35 (standardized regression coefficient) or greater for that factor, and was less than 0.35 for the other factor. For the assessment of "current level of skills" possessed, the 20 items related to teaching activities loaded on the first factor, while the 12 items related to educational technologies loaded on the second factor. These two factors explained 63.5 % of the variance in the raw data. For the assessment of "level of interest in learning more," 18 items related to teaching activities loaded on the first factor and eight items loaded on the second factor. The two factors explained 72.2 % of the variance.

RESULTS

An analysis of the data revealed a mean of 14.9 years of university teaching experience among the subjects (Table 1). The mean appointment was 27.7 % time assigned to teaching, with 6.2 semester credit hours of instruction (4.0 undergraduate and 2.2 graduate) per year. Average class size among respondents was 21 students.

Table 1. Respondents' Teaching-Related Demographics Characteristics

Characteristic	n	Mean	S.D.	Median
Current FTE teaching assignment	108	27.70	25.5	20.0
Number of years teaching at college level	110	14.91	9.97	13.5
Number of credit hours taught per year - graduate level	111	2.24	1.72	3.0
Number of credit hours taught per year - undergraduate level	110	3.95	3.60	3.0
Average class size	108	20.94	15.27	15.5

Question 1. When asked to assess their **current level of skill** on 20 items related to **teaching activities**, six items received a mean score of 3.0 or higher (excellent = 4, good = 3, fair = 2, none = 1) (Table 2). Over 75 % of respondents rated their own abilities as "good" or "excellent" on eight of the items. Based on the obtained mean values, respondents perceived that they had the highest level of skill in traditional instructional areas such as lecture, and designing and revising a course. Conversely, respondents rated their level of skills lowest in less traditional areas such as developing teaching portfolios, discovery learning activities, and peer observation. More than 50 % of respondents rated their level of skills as "good" to "excellent" on 15 of the 20 teaching activity items.

Table 2. Respondents' Level of Skill in Teaching Activities.

		Percent of Respondents by Level of Skill					
Teaching Method	n	Excellent	Good	Fair	None	Mean*	S.D.
Lecture	112	25.9	68.8	5.4	0.0	3.21	.52
Designing / revising a course	111	24.3	68.5	6.3	0.9	3.16	.56
Hands-on exercises and activities	110	29.1	57.3	11.8	1.8	3.14	.68
Preparing course syllabi	111	27.0	59.5	12.6	0.9	3.13	.65
Demonstration	107	27.1	57.0	15.9	0.0	3.11	.65
Preparing instructional materials	111	25.2	60.4	14.4	0.0	3.11	.62
Preparing effective lesson plans	111	17.1	63.1	18.9	0.9	2.96	.63
Motivating students / creating interest	113	18.6	57.5	23.9	0.0	2.95	.65
Encouraging critical thinking	110	19.1	54.5	26.4	0.0	2.93	.67
Hands-on problem solving activities	107	20.6	53.3	23.4	2.8	2.92	.74
Discussion-based instruction	111	16.2	51.4	27.0	5.4	2.78	.78
Evaluating student learning	111	8.1	63.1	26.1	2.7	2.77	.63
Evaluating my teaching	107	12.1	51.4	34.6	1.9	2.74	.69
Improving student reading / writing	110	9.1	56.4	32.7	1.8	2.73	.65
Cooperative learning (group projects)	108	12.0	44.4	37.0	6.5	2.62	.78
Alternative teaching methods	108	5.6	43.5	43.5	7.4	2.47	.72
Case studies	104	12.5	36.5	30.8	20.2	2.41	.95
Faculty peer observation	98	7.1	36.7	31.6	24.5	2.27	.91
Discovery learning activities	95	6.3	31.6	43.2	18.9	2.25	.84
Developing a teaching portfolio	103	7.8	21.4	38.8	32.0	2.05	.92

* Excellent = 4, Good = 3, Fair = 2, None = 1

Question 2. Table 3 presents the data regarding the respondents' **level of interest in learning more about** the items related to **teaching activities**. Mean ratings ranged from a high of 3.35 to a low of 2.68 across all of the 20 items (high = 4, moderate = 3, low = 2, none = 1). Twelve of the 20 items were rated above a 3.0, with at least 75 % of the respondents indicating a "high" or "moderate" level of interest in learning more about these items. Over 50 % of the respondents reported a "high" or "moderate" level of interest in learning more about each of the 20 items.

Table 3. Respondents' Interest in Learning More About Teaching Activities.

Teaching Method	n	Percent of Respondents by Level of Interest High	Moderate	Low	None	Mean*	S.D.
Motivating students / creating interest	108	53.7	31.5	11.1	3.7	3.35	.82
Encouraging critical thinking	110	53.6	30.0	11.8	4.5	3.33	.86
Improving student reading/writing	107	49.5	31.8	13.1	5.6	3.25	.89
Alternative teaching methods	108	40.7	45.4	11.1	2.8	3.24	.76
Evaluating my teaching	108	40.7	45.4	9.3	4.6	3.22	.80
Evaluating student learning	109	43.1	37.6	16.5	2.8	3.21	.82
Lecture	109	35.8	43.1	17.4	4.0	3.11	.82
Hands-on problem solving activities	104	29.8	56.7	7.7	5.8	3.10	.77
Cooperative learning (group projects)	105	32.4	47.6	17.1	2.9	3.10	.78
Hands-on exercises and activities	104	27.9	48.1	21.2	2.9	3.10	.78
Discussion-based instruction	110	33.6	43.6	20.9	1.8	3.09	.78
Demonstration	105	31.4	47.6	21.0	1.0	3.08	.75
Preparing instructional materials	109	30.3	42.2	22.9	4.6	2.98	.85
Preparing effective lesson plans	109	30.3	42.2	22.0	5.5	2.97	.87
Designing / revising a course	109	30.3	38.5	23.9	7.3	2.92	.91
Discovery learning activities	93	26.9	39.8	26.9	6.5	2.87	.89
Faculty peer observation	104	23.1	44.2	24.0	8.7	2.82	.89
Case studies	101	26.7	38.6	24.8	9.9	2.82	.94
Preparing course syllabi	108	22.2	41.7	26.9	9.3	2.77	.90
Developing a teaching portfolio	107	23.4	37.4	23.4	15.9	2.68	1.01

* High = 4, Moderate = 3, Low = 2, None = 1

Question 3. Subjects were asked to assess their **current level of skill** on 12 items related to **educational technologies** (Table 4). No item received a mean rating above 2.56. The only item for which at least 50 % of the respondents rated their own ability as "good" or "excellent" was the use of presentation graphics. Additionally, only 25 % or fewer rated their own ability as good or excellent on seven of the 12 items.

Table 4. Respondents' Current Level of Skill in Educational Technologies

		Percent of Respondents by Level of Skill					
Instructional Technology	n	Excellent	Good	Fair	None	Mean*	S.D.
Presentation graphics	113	23.9	30.1	23.9	22.1	2.56	1.09
Computer projection systems	111	15.3	27.0	25.2	32.4	2.25	1.07
Document or image scanners	112	11.6	31.3	19.6	37.5	2.17	1.06
Digital cameras (still image)	107	12.1	24.3	25.2	38.3	2.10	1.05
Interactive technology based instruction	109	5.5	28.4	35.8	30.3	2.09	.90
Computer multimedia materials	107	8.4	14.0	36.4	41.1	1.90	.94
Internet course web pages	111	5.4	15.3	28.8	50.5	1.76	.91
Digital video cameras	104	3.8	16.3	23.1	56.7	1.67	.89
Internet course discussion groups	111	4.5	8.1	21.6	65.8	1.51	.83
Teaching via distance education	104	0.0	7.7	30.8	61.5	1.46	.64
Video conferencing technologies	109	0.9	4.6	23.9	70.6	1.36	.62
Teaching via interactive video	107	0.0	4.7	15.0	80.4	1.24	.53

* Excellent = 4, Good = 3, Fair = 2, None = 1

Question 4. Subjects were asked to indicate their **level of interest in learning more about** items related to the use of **instructional technology** (Table 5). Obtained mean ratings for these 12 items ranged from 3.30 to 2.57, indicating that the respondents had some interest in learning more about each of the items. Interest in five of the items was rated as "high" or "moderate" by more than 75 % of the respondents, and at least 50 % of respondents indicated a high or moderate interest in all items.

Table 5. Respondents' Interest in Learning More About Educational Technologies

Instructional Technology	n	High	Moderate	Low	None	Mean*	S.D.
		Percent of Respondents by Level of Interest					
Interactive technology based instruction	109	47.7	36.7	13.8	1.8	3.30	.78
Internet course web pages	111	41.4	33.3	21.6	3.6	3.13	.88
Computer multimedia materials	108	36.1	43.5	15.7	4.6	3.11	.84
Presentation graphics	110	42.7	33.6	12.7	10.9	3.08	1.0
Computer projection systems	112	30.4	47.3	17.9	4.5	3.04	.82
Digital cameras (still image)	108	28.7	44.0	18.3	9.2	2.94	.87
Document or image scanners	109	28.4	43.1	21.1	7.3	2.93	.89
Digital video cameras	109	28.4	44.0	18.3	9.2	2.92	.91
Internet course discussion groups	109	28.4	27.5	31.2	12.8	2.72	1.02
Teaching via distance education	106	24.5	33.0	2.92	13.2	2.69	.99
Video conferencing technologies	107	22.4	34.6	29.9	13.1	2.66	.97
Teaching via interactive video	106	23.6	30.2	25.5	20.8	2.57	1.07

* High = 4, Moderate = 3, Low = 2, None = 1

Question 5. For both teaching activities and educational technologies, items were rank ordered based on the mean values reported in Tables 2 and 3 (teaching activities) and Tables 4 and 5 (educational technologies). Spearman correlation coefficients were then calculated to assess the relationships between respondents' perceived levels of skill and their interest in learning more about the items. Davis' conventions (1971) were used to describe the magnitude of the relationships. A low positive relationship existed (r = .16) between level of skill and interest in learning more about teaching activities. However, a substantial positive relationship (r = .69) existed between level of skill and interest in learning more about educational technologies.

Question 6. Teaching related demographics were correlated with level of interest in learning more about each of the items in the survey. Because of the nature of the data, the Spearman correlation coefficient was calculated for each. In order to provide practical guidance in identifying groups of faculty members who may have interest in specific items for in-service instructional activities, only items with a "moderate" correlation of .30 or greater were considered (Davis, 1971). Years of experience was the only demographic variable with a moderate association with faculty members' level of interest in learning more about selected topics. The following items were moderately negatively correlated with years of experience: cooperative learning (r = -.30), discussion (r = -.37), discovery learning (r = -.33), and developing a teaching portfolio (r = -.41).

CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

Subjects in this study were teaching faculty in a land-grant college of agriculture. Among the participants, the average annual full-time equivalent devoted to teaching was about one-quarter time, or about one three-credit course per semester. In spite of their limited teaching assignment, respondents' level of interest in learning more about each of the items was high.

Teaching activities. Faculty members were asked to rate their personal level of skill on each of 20 teaching activities. They rated their level of skill as generally good to excellent for the more traditional teaching activities such as lecture, demonstration, preparing teaching materials, and motivating students. Faculty members rated their skill lower on the less traditional teaching activities such as alternative teaching activities, using cooperative learning and case studies, and faculty peer observation.

Overall, faculty members perceive that they possess relatively high levels of skills in traditional teaching skills. It would be interesting to have an assessment of the instructors' abilities on these skills from students and faculty peers to compare with these results.

Although they had rated their abilities as high to moderate, respondents also rated their interest in learning more as relatively high. They indicated high interest in learning more about such skills as motivating students, encouraging critical thinking, using alternative teaching activities, and evaluating teaching and learning. High to moderate interest was even indicated in learning more about such skills as lecture and demonstration.

The relationship between the respondents' perceived level of skill and their level of interest in learning more about teaching activities was low, having less than three percent of variance in common. Thus, self-perceived level of skill in teaching activities was not a good indicator of interest in learning more about these items.

Educational technologies. When asked to rate their level of skill on 12 educational technologies, respondents rated their abilities much lower than their self-ratings of teaching activities. Over 50% of the faculty members rated their skill levels as fair or none on 11 of the 12 items. Further, over 50% reported that they had no skills in six educational technology areas related to Internet course delivery and distance education.

Faculty members were asked to indicate their interest in learning more about each of the technologies. While the data indicate a positive interest in all of the items, those technologies which integrate the computer received the highest levels of interest. This would indicate that the faculty members acknowledge a need for training on such skills as interactive technology based instruction, Internet web pages, and computer multimedia materials.

These two findings are likely an indicator of the limited exposure of the faculty to the use of these technologies, or the limited expectations for their use in the past. However, faculty members will be expected to possess some level of skill on these technologies in the future. It is assumed that faculty members are aware of this, as indicated by their level of interest in learning more about these educational technologies.

There was a substantial positive relationship between the respondents' perceived level of skill and their level of interest in learning more about educational technologies. While they rated their skills in many of these technologies as low, they tended to show interest in learning more about the technologies with which they had some level of skill. For those technologies in which level of skill was especially low, interest in learning more was also low.

Clearly, there is a need for in-service training of faculty members in the use of modern educational technologies. Further, addressing this need among pre-service faculty members could limit the scope of faculty teaching-related deficiencies in the future.

Because there were few practically significant relationships found between the demographic variables and interest in learning more about teaching activities and technologies, participation should be open to all interested faculty members regardless of demographics. However, more experienced faculty members may be less interested in learning about non-traditional classroom teaching activities.

Recommendations. It appears that teaching faculty in this college are interested in a wide variety of topics related to instructional improvement. A faculty development plan is being planned and implemented in the college. Based on the results of this study, the following topics should receive priority in planning faculty development activities: motivating students, encouraging critical thinking, using interactive technology in teaching, techniques to improve student reading and writing, alternate teaching methods, evaluating teaching, and evaluating student learning.

ERIC

REFERENCES

Baker, M.; Hoover, T.; & Rudd, R. (1996, August). A Faculty Teaching and Learning Needs Assessment, unpublished instrument. Gainesville: University of Florida.

Board on Agriculture, National Research Council. (1992). Agriculture and the Undergraduate. Washington, DC: National Academy Press.

Boyer, E. L. (1990). Scholarship Reconsidered: Priorities of the Professoriate. Carnegie Foundation for the Advancement of Teaching. San Francisco: Jossey-Bass.

Bowman, R.A., Loynachan, T.E., & Schafer, J.W. (1986, Fall). Attitudes of agronomy teachers on preparation for teaching. Journal of Agronomic Education, 15(2): 96-100.

Davis, J. A. (1971). Elementary Survey Analysis. Englewood, NJ: Prentice-Hall.

Ely, D.G. and Ragland, K.K. (1989, June). Training to teach. NACTA Journal, 33(2), 43-45.

Engleberg, I. N. (1991). Needs assessment: The first step in staff development. The Journal of Staff, Program, & Organization Development, 9(4): 215-222.

Jackman, D. H. & Swan, M. K., (1995). Faculty perceptions of teaching support center activities. The Journal of Staff, Program, & Organization Development, 12(4): 229-235.

Kirby, B. M., Waldvogel, M., & Overton, C. (1998). Instructional technology literacy levels and educational needs of College of Agricultural and Life Sciences (CALS) faculty. Proceedings of the 48th Annual Southern Region Agricultural Education Research Meeting. 48: 233-244.

Lowman, J. (1995). Mastering the Techniques of Teaching. San Francisco: Jossey-Bass.

Pals, D. A. (1988, June). Faculty attitudes toward teaching improvement. NACTA Journal, 46-51.

Simerly, C. B. (1990, March). Faculty development needs in colleges of agriculture. NACTA Journal. 11-14.

Wiedmer, T. L. (1994). Perspectives on scholarship in education: Undergraduate and graduate students' views on faculty scholarship. The Journal of Staff, Program, & Organization Development, 12(2): 81-95.

PERCEIVED LEVEL OF TEACHING SKILLS AND INTEREST IN TEACHING IMPROVEMENT AMONG FACULTY IN A LAND-GRANT COLLEGE OF AGRICULTURE:

A Critique

Sharon B. Stringer
Pennsylvania State University

As scrutiny of the quality of secondary education intensifies across the nation, it is appropriate for researchers to address the level of teaching skill among post-secondary educators. Using Boyer's invitation to redefine scholarship to include teaching, the authors establish an appropriate theoretical base for investigating "one of the most important activities of a college professor."

The researchers adequately state the purpose of the survey and the six questions that guided the research. While two related to the level of skill and interest in learning more about selected teaching activities, three questions addressed the perceived level of skill and interest in learning more about educational technologies. I wonder if the inclusion of educational technologies in faculty perception of their teaching skill indicates there is literature to support a correlation between teaching skill and educational technology competency. If so, that literature was not included here.

Nonetheless, the author paid careful attention to the research methodology as evidenced by the methods section. One suggestion to the methods section, however, would be to tell the reader when the survey was completed. Given the rapid changes that occur relevant to technology, a time frame would provide the necessary benchmark for future studies as well as enhance clarity for the reader.

Results to the survey provide valuable insight about the perceived level of skill relevant to selected teaching activities and educational technologies. However, more research is necessary. I concur with the authors that it would be interesting to have students and faculty assess teaching ability.

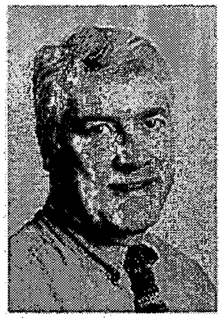
In addition the information presented, what about the findings relative to agricultural faculty at other land-grant institution? Data about teaching skills of agricultural faculty other than those in the study would have provided context for the research and would have strengthened the literature review.

While the findings to this survey are limited only by the concerns of any study based on self-report, the benefits of this research are many. Administrators who design professional development curriculum for faculty, and researchers who address pedagogical issues in agricultural education will find the results useful. The researchers are to be commended for their careful attention to such an important issue.

NAERC '99

Fresh From Florida

Alternative versus Conventional Agricultural Paradigms: A Study of Senior Agriculture Majors



Donna Graham
University of Arkansas

Donald Johnson
University of Arkansas

George Wardlow
Univeristy of Arkansas

INTRODUCTION AND THEORETICAL FRAMEWORK

Two divergent viewpoints are developing regarding the desired future of agricultural production in the United States. According to Beus and Dunlap (1991) some promote the vision of agriculture as large scale, industrialized production that is capital intensive, highly mechanized, using extensive amounts of synthetic fertilizers and pesticides and may involve highly concentrated and intense livestock production. This is called "conventional agriculture" according to Knorr and Watkins (1986). Conventional agriculture may also include the agricultural business complex with which today's farmers are highly integrated (Martinson and Campbell, 1980).

Other individuals have a vision for agriculture as smaller farm units with reduced use of agricultural chemicals, reduced energy use, greater farm self-sufficiency, and a goal of improved conservation and regeneration of agricultural resources such as soil and water (Buttel, Gillespie, Janke, Caldwell and Sarrantonio,1986). This is called "alternative agriculture" (Lockeretz, 1986) and encompasses many different approaches, ranging from organic farming to permaculture.

These conventional and alternative agriculture proponents differ drastically in their view of agriculture's impact on the environment, the ecological and socio-economic sustainability of current practices and the policies needed to maintain a productive agriculture and viable rural

ERIC

America. Defenders of the conventional agricultural system feel that current problems in agriculture can be solved by scientific and technical progress while those favoring alternative agriculture believe that conventional agriculture needs a complete revamping to solve the ecological, economic and social problems associated with agriculture (Beus, Dunlap, Jimmerson, and Holmes, 1991).

Increased public demands to hold corporations accountable for environmental damage and the increasing willingness of federal and state authorities to pursue civil and criminal environmental cases are expanding into the agricultural community. Opinion polls reveal that 80 % of Americans feel that farmers are polluters, especially those farmers using pesticides. It has been estimated that 64 % of America's rivers have been polluted as a result of agricultural production practices (Copeland, 1993).

Proponents of conventional agriculture have often ridiculed the environmental movement accusing their critics of being radical, of knowing little about farming, or the economics of the "real world" (Beus and Dunlap, 1990). This difference of opinion has escalated into political confrontation.

Beus and Dunlap (1991) propose that these viewpoints are paradigms that can be represented on a continuum from alternative to conventional. In order to assess adherence to either the alternative or conventional viewpoint, they developed the Alternative vs. Conventional Agricultural Paradigm (ACAP) scale. This scale measures basic beliefs and values assumed to constitute the two competing perspectives of agriculture. The instrument has been validated with known groups of alternative and conventional agriculturists, as well as statewide groups of farmers and agricultural faculty at a state land-grant university.

Graduates of U.S. colleges of agriculture will become leaders who will shape the policies and decisions about agriculture for the next generation. As the groups supporting alternative agriculture seem to be growing in number, size, and political influence while the farm population decreases, it will be incumbent upon agricultural graduates to assist communities to critically analyze agricultural science and practice. Agricultural education is situated in an important position in the ongoing debates of alternative and conventional agriculture production. Since little is known about how these debates have influenced students enrolled in colleges of agriculture, it is important to understand the beliefs and values of future players in this agricultural debate.

503

PURPOSE AND OBJECTIVES

The purpose of this study was to describe the beliefs of graduating seniors in a college of agricultural, food and life sciences relative to their adherence to alternative versus conventional agricultural paradigms.

The specific objectives of the study were to:

1. Determine the alternative or conventional agricultural beliefs, as measured by ACAP scale scores, of senior agriculture majors enrolled in a land-grant college of agricultural, food and life sciences.
2. Compare alternative or conventional beliefs of senior agriculture students by major, gender, parent's education, and pre-college residence.
3. Compare the ACAP scale scores of senior agriculture majors to ACAP scores of known groups of conventional and alternative agriculture.

METHODS AND PROCEDURES

The population for this study was graduating seniors in a college of agricultural, food and life sciences enrolled in a capstone course, AGED 4003 - Issues in Agriculture. The instrument used was the Alternative-Conventional Agricultural Paradigm (ACAP) scale developed by Beus and Dunlap (1991). It contains 24 bipolar statements that portray the respective positions of the two paradigms: the conventional view of agriculture and the alternative view of agriculture. The ACAP instrument was administered to 140 students in the fall and spring semester for four semesters, beginning in the fall of 1997 through the spring semester of 1999. Students enrolled in all of the eleven majors in agriculture completed the survey.

The 24 items on the instrument are organized into six major dimensions: centralization vs. decentralization, dependence vs. independence; competition vs. community; domination of nature vs. harmony with nature; specialization vs. diversity; and exploitation vs. restraint. Some items are value oriented, while others focus more on beliefs about agricultural practices or issues. Some items present completely opposite positions, while the positions in other items were designed to accurately portray the contrasting positions held by the alternative or conventional agriculturists. Twelve of the 24 items are reversed in direction to help offset response set bias. A five-point scale is placed between each of the two contrasting positions with 3 representing a neutral position. Respondents were asked to circle one number per item. The possible range of total scores is 24 to 120 with a low score representing a strong endorsement of conventional agriculture and a high score representing strong endorsement of alternative agriculture. Figure 1 shows an example item from the ACAP instrument.

The abundance and relatively low prices of food in the United States are evidence that American agriculture is the most successful in the world.	1 2 3 4 5	High energy use, soil erosion, water pollution, etc. are evidence that U.S. agriculture is not nearly as successful as many believe it to be.

Figure 1: Example item from the ACAP instrument.

Beus and Dunlap (1991) reported that the average internal consistency of the instrument ranged from .74 to .93 for different groups, with an overall average of .88. Construct validity was established through comparisons of known alternative and conventional agriculturists verified by the developers of the instrument. For the present study, a coefficient alpha reliability estimate of .78 was obtained. Data were analyzed using the SAS® statistical package.

FINDINGS

Students in all 11 majors of the Bachelor of Science in Agriculture degree were represented in this study. Majors in common discipline areas were collapsed into departmental majors,(i.e. urban horticulture/landscape design majors and other horticulture majors), creating eight different majors for the study. Students majoring in agricultural economics/agribusiness represented 22.9 % of the respondents and poultry science majors 18.6 % of the total. The third largest group of respondents was majors in environmental science with 13.6 %. Agricultural and extension education and horticulture majors each represented 11.4 % of the total, while animal science had 10.7 %. Agronomy (6.4%) and food science (5.0%) majors were the least common majors. These percentages approximate the percentage of seniors graduating in each of the agriculture majors in the college.

Table 1
Classification of seniors enrolled in capstone course

Major	n	Percent
Agricultural Economics/Business	32	22.9
Agricultural & Extension Education	16	11.4
Agronomy	9	6.4
Animal Science	15	10.7
Environmental Science	19	13.6
Food Science	7	5.0
Horticulture	16	11.4
Poultry Science	26	18.6
Total	140	100.0

Objective 1

ACAP scale scores ranged from 49 to 118 (Table 2) with the former representing strong endorsement of the conventional agriculture paradigm and the latter strong endorsement of the alternative paradigm. The mean ACAP score for all seniors in agricultural, food, and life sciences was 79.09. Considerable variation in mean ACAP scores occurred across the various majors in the College, ranging from a low of 70.44 for agronomy students (more conventional than the known conventional agriculturists) to a high of 88.06 for horticulture students. The greatest variability occurred in the scores for environmental science students with a range of scores from 49-109, followed by those majoring in horticulture where the scores ranged from 61-118.

Horticulture majors (Mean=88.06) had the highest mean ACAP scale score. The high ACAP scores of some of these horticulture majors is similar to that of known alternative agriculturists

and signifies they are much more likely to endorse the alternative agriculture viewpoint. Likewise, environmental science majors (Mean =87.37) had scores that ranged from 49-109, indicating students with opposite viewpoints on these paradigms. Food science majors (Mean =79.86) also had great variation in the range of ACAP scores. Agronomy students had the lowest overall mean ACAP score (Mean =70.44), followed by agricultural economics/agribusiness students (Mean=74.94). These scores are similar to known conventional agricultural viewpoints. The majors in animal science, agricultural and extension education, agronomy, and poultry science had less variation in mean scores than the other majors did.

Table 2
ACAP scale scores for seniors majoring in agricultural, food and life sciences

Major	ACAP Mean	S.D.	Range
Agronomy	70.44	8.49	56- 79
Agricultural Economics/Business	74.94	8.50	62- 91
Poultry Science	76.38	8.12	59- 90
Animal Science	77.46	7.09	64- 89
Agricultural & Extension Education	79.06	7.51	65- 93
Food Science	79.86	12.06	71-106
Environmental Science	87.36	13.66	49-109
Horticulture	88.06	17.09	61-118
Total	79.09	11.51	49-118

Since there was variation across academic programs of study, a comparison was made to determine if differences existed between majors when combined into production-oriented majors versus human-oriented majors in the college of agriculture. The majors considered more production-oriented included agronomy, agricultural economics/ agribusiness, poultry science, and animal science. The majors classified with less production emphasis, social science, or human-oriented fields were agricultural and extension education, environmental sciences, food science, and horticulture. For the purpose of the analysis, the group classifications were called production versus non-production majors.

The production-oriented major's ACAP mean score of 75.36 was similar to other conventional agriculturists while the non-production majors (Mean=84.36) were moderately inclined toward the alternative agricultural paradigm. These data are shown in Table 3.

Table 3
Mean Comparisons of Majors by Production and Non-Production Orientations

Grouping of Majors	Number	Mean	Std Dev.
Production	82	75.36	8.16
Non Production	58	84.36	13.43

ERIC

Objective 2

Possible variations of the student's perspectives were examined by comparing ACAP scale scores and four background characteristics that might offer possible predictions of paradigmatic orientations: gender, pre-college residence, parent's educational level, and major (Table 4).

There were 99 (70.7%) male respondents and 39 (27.9%) female respondents in this study. Female students (Mean = 82.56) rated 4.69 points higher on the ACAP scale than did the male students (Mean = 77.87). To determine if a relationship existed between the ACAP score and gender, a correlation coefficient was computed on these variables. A low correlation ($r = .18$) was found between gender and ACAP scores (Davis, 1971) explaining less than four percent of the variance.

Traditionally, a majority of students studying agriculture have had a farm background. Although this situation is rapidly changing (Dyer and Breja, 1999), most of these students in this study had grown up on a farm or in a rural area. Prior to college enrollment, 38.6 % reported they lived on a farm, 21.4 % lived in rural, non-farm areas. Equal numbers of students (14.3% respectively) reported they lived in towns under 10,000 population or in cities between 10,000-50,000. Another 10.7 % lived in cities over 50,000 in population.

While the mean of 78.93 is a closer affiliation to conventional paradigm for those majors who grew up on a farm, ACAP scale scores were similar for all students regardless of pre-college residence. The students who grew up in towns under 10,000 population reported the lowest mean ACAP score of 78.30, followed by those who grew up in cities of 50,000 or more with a mean ACAP score of 78.33. The correlation ($r = -.02$) indicated a negligible relationship between pre-college residence and ACAP scale scores (Davis, 1971) .

There was an almost equal distribution of the respondents' parents who had completed high school, some college, or the bachelor's degree. A small percentage of these respondents had parents with less than a high school education. There were more than 40 % of the respondents' parents with college degrees. There were 33 (23.6%) of the respondents' fathers and 36 (25.7%) of the respondents' mothers who had a bachelor degree and an additional 27 (19.3%) and 21 (15.0%) of the fathers and mothers, respectively, with an advanced degree. The ACAP mean scores of educational level of the respondents' fathers ranged from 76.06 for those with a Bachelor's degree to a mean score of 81.67 for fathers with a Master's or Ph.D. A negative, but negligible, relationship ($r = -.01$) was found between ACAP scores and the father's level of education. Overall, the mean scores of the respondents' father's level of education were similar. The mean ACAP scores of the respondents' mother's educational level ranged from 76.25 for those with a bachelor's degree to 81.25 for those with some college experience. The mother's educational level also had a negative and low relationship ($r = -.12$) with the ACAP scale score (Davis, 1971).

Table 4
ACAP scale scores for agricultural majors listed by gender, pre-college residence, and educational level of their parents.

Gender	n	Percent	Mean	Std. Dev	Range
Male	99	70.71	77.87	11.72	49-118
Female	39	27.86	82.56	10.15	61-108
Missing	2				
Pre-College Residence					
Farm	54	38.57	78.93	10.88	56-106
Rural, Non Farm	30	21.42	79.73	12.42	59-109
Town Under 10,000	20	14.29	78.30	12.22	49-107
City 10,000-50,000	20	14.29	80.50	12.78	64-118
City Over 50,000	15	10.71	78.33	10.47	65- 97
Missing	1				
Education of Father					
Less than H.S. diploma	12	8.57	80.91	5.55	69- 88
H. S. diploma or GED	34	24.29	78.09	11.65	59-108
Some College	32	22.86	80.41	10.59	64-109
B.S. Degree	33	23.57	76.06	10.72	56-107
M.S. or Ph.D.	27	19.29	81.67	14.69	49-118
Missing	2				
Education of Mother					
Less than H.S. diploma	8	5.71	79.50	16.26	68- 91
H.S. diploma or GED	41	29.29	79.54	11.02	59-108
Some College	32	22.86	81.25	11.09	49-109
B.S. Degree	36	25.71	76.25	12.28	56-118
M.S. or Ph.D.	21	15.00	79.19	12.50	65-107
Missing	2				

Objective 3

To determine if senior agricultural majors were similar in their viewpoints with those of known conventional and alternative agriculturists, a comparison was made of the mean ACAP scores of these groups. There were nine groups used in the original research, which were classified as either alternative agriculturists or conventional agriculturists. Known alternative agriculturists included members of a state association of permaculture, members of a coalition for alternatives to pesticides, and certified organic farmers. Conventional agriculturists included Farm Bureau members, chemical dealers, and aerial pesticide applicators. A statewide farmer sample was also used as intermediate between the known groups of alternative and conventional agriculture; however, their responses are more similar to the conventional group than to the alternative groups. For a complete description of this research, see Beus and Dunlap, 1991.

ERIC Full Text Provided by ERIC

The mean ACAP score of the senior agricultural majors (Mean = 79.1) was almost the same as the statewide farmer sample (Mean =80.9) and slightly higher than the known conventional agriculturists (Mean =73.3). The alternative agriculturists had an overall mean score of 102.1. The means and range of scores are shown in Table 5.

Table 5
Means scores of the alternative agriculturists, conventional agriculturists, and seniors majoring in agriculture.

Group	Mean	Std. Dev.	Range
Alternative Agriculturists	102.1	14.0	46-120
Statewide farmers	80.9	11.6	37-114
Conventional Agriculturists	73.3	11.7	41-105
Agriculture Students	79.1	11.5	49-118

CONCLUSIONS AND RECOMMENDATIONS

Overall, these senior agricultural majors adhere to the conventional agricultural paradigm. They have similar scores to those of statewide farmers and conventional agriculturists. The conventional agriculturists still largely agree that maintaining rural communities is essential to the future of agriculture, see farm tradition and culture as essential to good agriculture, and are more likely to see farming as primarily a business rather than a way of life.

The agronomy, agribusiness, poultry science, and animal science majors in this study hold more of a conventional perspective of agriculture and would thus endorse conventional agricultural practices. By comparison, environmental science and horticulture majors tended more toward the alternative agriculture paradigm. Agricultural and extension education and food science majors hold more conventional views yet are more centered in between other majors of the college according to their mean ACAP scores. Variation in the scores by the different majors indicates that these seniors have diverse viewpoints on the agricultural paradigms. Those majors considered having less production emphasis, or a social science or human-orientation had higher mean ACAP scores.

Differences in the pre-college residence, and parent's educational level were low or negligible and indicated no trends. However, males tended to favor conventional agriculture when compared to females. This trend follows other research, which indicates that females are more likely to endorse more strongly than do men environmental protection, appropriate technology, risk avoidance, and other issues closely related to the alternative agriculture paradigm (Blocker and Eckberg, 1989). However, with only a five-point difference in the means, one could conclude that any differences might be a function of choice of major by gender.

ERIC Full Text Provided by ERIC

Based upon the findings of this research, the following recommendations were made:

1. Further study is needed to determine if students select majors based on their beliefs of the paradigm or if their major influences their paradigm.
2. Replication of this study is needed to determine the alternative and conventional paradigms of entering students, if a student's view of the paradigms changes over a period of time, and if faculty influence student viewpoints.
3. Further study is needed to determine if the alternative or conventional beliefs of agriculture faculty are similar to agriculture majors.
4. Further study is needed to determine if the alternative or conventional beliefs of non-agriculture majors are similar to agriculture majors.
5. A greater philosophical question for study is whether colleges of agriculture are exposing students to differing viewpoints regarding production practices in agriculture.

ERIC Full Text Provided by ERIC

REFERENCES

Beus, C.E .& Dunlap, R.E. (1990). Conventional versus alternative agriculture: the paradigmatic roots of the debate. Rural Sociology 55:590-616.

Beus, C.E. & Dunlap, R.E. (1991). Measuring adherence to alternative vs. conventional agricultural paradigms: a proposed scale. Rural Sociology 56: 433-460.

Beus, C.E., Dunlap, R.E., Jimmerson, R.M., & Holmes W.L. (1991). Competing paradigms: The debate between alternative and conventional agriculture. Research Bulletin XB1020, Agricultural Research Center. Washington State University: Pullman, WA.

Beus, C.E. & Dunlap, R.E. (1994). Agricultural paradigms and the practice of agriculture. Rural Sociology 59: 620-635.

Beus, C.E. & Dunlap, R.E. (1993). Agricultural policy debates: examining the alternatives and conventional perspectives. American Journal of Alternative Agriculture. 8: 93-106.

Blocker, J.T. & Eckberg, D.L. (1989). Environmental issues as women's issues: general concerns and local hazards. Social Science Quarterly. 70:586-593.

Buttel, F.H., Gillespie, G.W., Janke, .R., Caldwell, B., and Sarrantonio, M. (1986). Reduced-input agricultural systems: rationale and prospects. Journal of Alternative Agriculture. 1:58-64.

Copeland, J. (1993). The criminalization of environmental law: implications for agriculture. National Center for Agricultural Law Research and Information. Fayetteville, AR.

Davis, J.A. (1971). Elementary survey analysis. Englewood, NJ: Prentice-Hall.

Dyer, J.E. & Breja, L. (1999). Predictors of student retention in colleges of agriculture. Proceedings of the Southern Agricultural Education Research Meeting. 49, 144-152.

Knorr, D. and Watkins, T.R. (Eds.) (1986). Alterations in food production. New York: Van Nostrand Reinhold Company.

Lockeretz, W. (1986). Alternative agriculture. In Kenneth A. Dahlberg (Ed.) New Directions for Agriculture and Agricultural Research. Totowa, NJ: Rowman & Allanheld.

Martinson, O.B. & Campbell, G.R. (1980). Betwixt and between: farmers and the marketing of agricultural inputs and outputs. In, F.H. Buttel and H. Newby, (Eds.) The Rural Sociology of the Advanced Societies, Montclair, NJ: Allanheld-Osmun.

ALTERNATIVE VERSUS CONVENTIONAL AGRICULTURAL PARADIGMS: A STUDY OF SENIOR AGRICULTURE MAJORS

A Critique

Sharon B. Stringer
Pennsylvania State University

Three things constitute a good research project: 1) sufficient reason, 2) appropriate methodology, and 3) valid conclusions. While the researchers who described the agricultural paradigms of seniors majoring in agriculture at a land-grant college of agricultural, food and life sciences had all three, there are still some questions to consider.

The authors provide an adequate background to the research, using appropriate literature to provide operational definitions of conventional and alternative agriculture. However, I am not so sure that the theoretical framework was clearly established. Bordens and Abbotts (1991) suggest that theory is a "set of assumptions about the cause for behavior and rules that specify how the cause operate." Could the researchers have presented a theory, theirs or someone else's about agricultural students' perception of alternative versus conventional agriculture? Or is it sufficient to just present the findings and let the reader establish her own theory?" Might we have suspected that the senior students at a land-grant college of agricultural, food and life sciences would embrace conventional agricultural paradigms?

A detailed explanation of the methodology is presented. Senior students in a capstone agricultural issues course were administered a survey to determine their adherence to alternative or conventional agricultural paradigms.

Another consideration for the research is the impact that the course itself contributed to students' beliefs. Was the instrument administered at the beginning, middle, or end of the semester? Does history impact the internal validity of the research?

The researchers validated my suspicions. Findings indicated that the students' adhered to conventional agricultural paradigms. Furthermore, students whose majors emphasized the social science or human orientation of agriculture had more of a tendency toward alternative agricultural practices.

As only four factors were used to compare students' beliefs, the authors are correct to suggest that further study is needed to determine if students select majors based on their beliefs or if their majors influence their paradigms. While the number of factors that could influence students' paradigms is too great to detail, researchers who replicate this study could consider parents' occupation, students' immediate career plans, and educational activities during their college careers.

In addition to their important contribution to the literature, the researchers should be commended for collecting benchmark data relevant to agricultural educators and policymakers of the 21st century.

NAERC '99
Research Fresh from Florida

Factors Influencing Enrollment in Agricultural Education Classes of Native American Students in Oklahoma

Robert Terry
Oklahoma State University

INTRODUCTION

Many diverse and unique groups of people have helped to shape the heritage of Oklahoma. People from all over the world have migrated to and through the region for a variety of reasons. Thousands of Americans and Europeans flocked to the area for the land runs of the late 1800s where land was given away on a first-come-first-served basis. Newly freed slaves from the South entered the area with hopes of making it a haven for African-Americans. However, the most commonly recognized ethnic groups historically associated with Oklahoma are Native American peoples. Today, more Native Americans live in Oklahoma than in any other state (Oklahoma Government Information Server [OGIS], 1998).

In 1541, when Coronado crossed the region searching for his "Lost City of Gold," tribal groups of Native Americans occupied the plains of the west and the woods of the east. Beginning in the 1820s, the Five Civilized Tribes -- Cherokee, Choctaw, Creek, Chickasaw, and Seminole – were relocated by the U.S. government from their tribal homes in the southeastern United States. They moved into lands ceded to them by the government that had belonged to the Osage and Quapaw peoples (OGIS, 1998).

After the Civil War, the U.S. government confiscated the western portions of what had become known as Indian Territory and began relocating tribes from the Great Plains into that area. The Caddo, Cheyenne, Arapaho, Kiowa, and Comanche tribes were given land in the territory. They were followed by other tribes such as the Pawnee, Kaw, Ponca, Iowa, and Sac and

Fox who were forcibly moved to the territory at the close of the 19th century (Morris, Goins, & McReynolds, 1991). Figure 1 is a map that shows the areas of land in present-day Oklahoma that were ceded to the 67 Native American tribes relocated to Indian Territory.

The 1990 census showed that 252,420 Native Americans lived in Oklahoma. That group comprises the largest ethnic minority in the state. Of Oklahoma's 3,258,000 citizens, 82.1% are white, 8.0% are Native American, 7.4% are African-American, 2.7% Hispanic, and 1.1% are Asian (OGIS, 1998).

Today, many people claiming Native American heritage are of mixed-race descent. Such a claim is correct in the legal sense. Tribes have rules for determining whether or not a person may be considered a member of their group. For instance, any person who could trace direct descent from a census of Cherokees taken between 1902-1907 can become a registered citizen of that tribe (The Cherokee Culture Society of Houston, 1995).

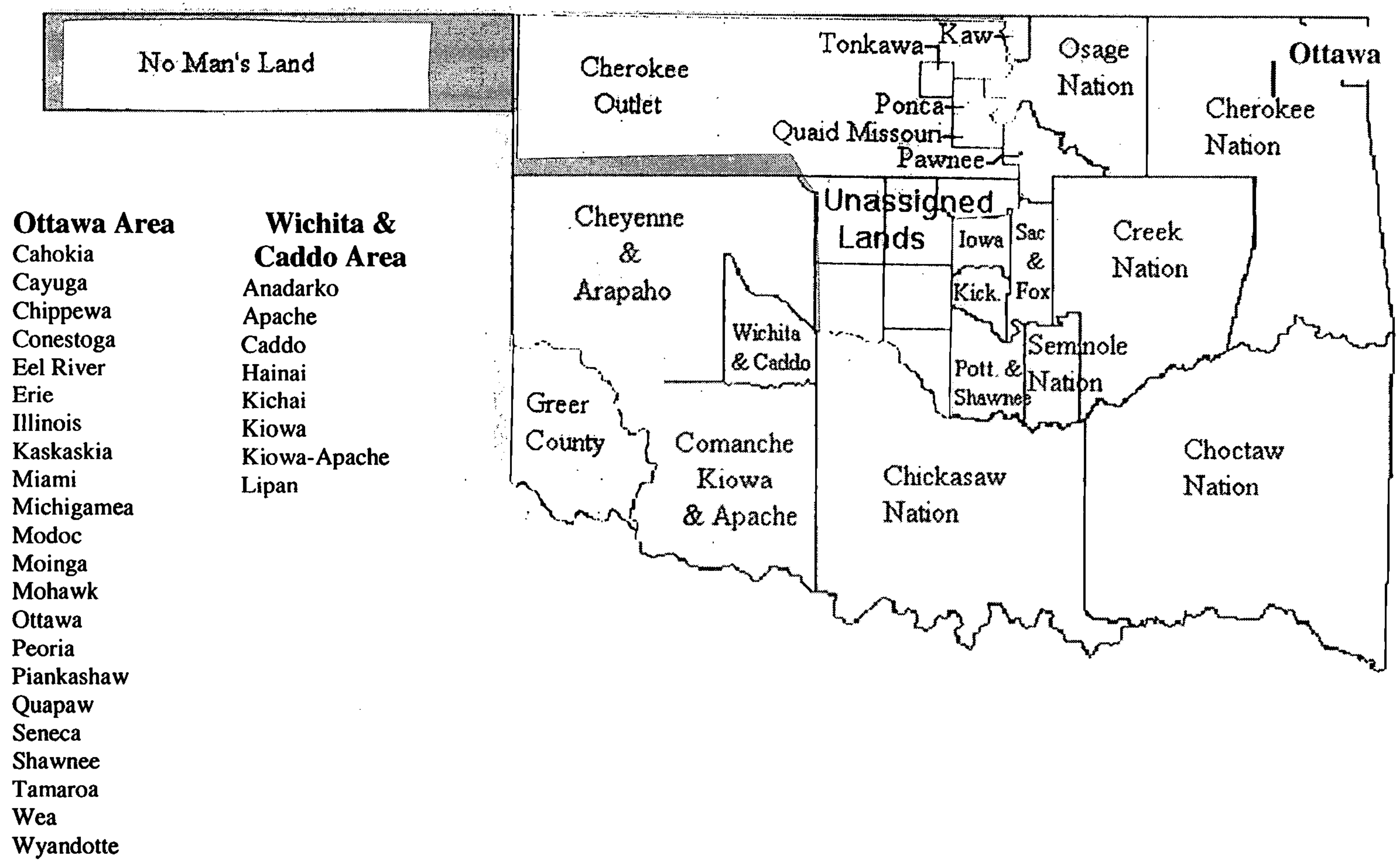


Figure 1. Native American territories in Oklahoma Territory, 1906 (adapted from Morris, Goings & McReynolds, 1991)

BEST COPY AVAILABLE

Students of Native American heritage also make up the largest minority group in secondary programs of Agricultural Education in Oklahoma. The office of Information and Analysis of the Oklahoma Department of Vocational-Technical Education (ODVTE, 1998) reported that the 1997-98 enrollment in Agricultural Education was comprised of 79% white students, 17% Native American students, 3% African-American students, 2% Hispanic students, and 0.2% Asian students. While these figures are comparable to the population composition of the state, in most states, the ethnic composition of agriculture students is not so diverse. The Committee on Agricultural Education in Secondary Schools (National Research Council, 1988) stated that agricultural education programs need to improve their efforts to reach minority students. Following the report of the Committee, one goal of the Strategic Plan for Agricultural Education was to "serve all people and groups without discrimination" (National Summit on Agricultural Education, 1989, p. 4).

As agricultural educators work to improve efforts to reach minority students, it is critical that they understand how students from these cultural groups differ from their more traditional white students. Longstreet (1978) concluded that there are distinct differences in students from various ethnic groups and that these differences are observable in classroom settings. One example of this uniqueness was found by Vicenti-Henio and Torres (1997). They concluded that the learning style of Native American students enrolled in agricultural education at Tohatchi High School tended to be more field independent than the national norm.

Researchers in the field of agricultural education such as Flores (1989) and Talbert and Larke (1993) have explored factors influencing minority enrollment in agricultural education classes in secondary schools. In their studies, they found definite differences between Hispanic and African-American students and their non-minority counterparts. Specifically, Talbert and Larke (1993) concluded that minority students came from less rural backgrounds, had less experience in 4-H and were less inclined to enroll in agricultural education classes due to agricultural reasons.

PURPOSE AND OBJECTIVES

The purpose of this study was to identify factors influencing Native American students to enroll in agricultural education courses. The objectives for the study were to:

1. Describe selected demographic and situational characteristics of Native American and non-Native American students enrolled in an introductory agricultural education course.
2. Compare Native American and non-Native American students enrolled in an introductory agricultural education course on reasons for enrolling, perceived barriers to enrolling, and attitudes towards careers related to agriculture.

METHODS

The population of the study consisted of the approximately 6500 students enrolled in Agriscience I during the spring semester of 1998 in the 355 high schools in Oklahoma that have Agricultural Education programs (ODVTE, 1998). A cluster sample was taken of individual Agricultural Education programs selected for having high enrollment of Native American students. Programs that reported having at least 40% of their total enrollment consisting of Native American students in the 1996-97 school year were included in the sample. Twenty-six programs were identified as meeting the criteria. The teachers at these programs were called and asked if they would be willing to participate in the study. They were also asked to indicate the number of students they had in their Agriscience I class or classes.

ERIC

The data collection instrument was a mailed questionnaire. Packets containing a questionnaire for each student and instructions for the teacher to follow in administering the instruments were sent to each of the 26 selected schools. Packets of completed questionnaires were returned from 17 schools yielding a 65.38% response rate. Because data were collected late in the school year, it was not possible to adequately check for non-response error.

The questionnaire was a replication of the instrument used by Talbert and Larke (1993) with one modification. Additional items related to the respondents' Native American heritage were added for this study. The questionnaire had four parts consisting of Student Information, Enrollment Information, Barriers to Enrollment, and Opinions about Agriculture.

Descriptive statistics were used to analyze demographic data. Analysis of Variance was used to compare students' Native American status on scaled variables related to Objective 2.

The scales developed by Talbert and Larke were used to measure students' reasons for enrolling, barriers to enrolling, and opinions about careers related to agriculture. As with the Talbert and Larke study, the following scales were used:

- Reasons for Enrolling – Agriculture, Influential Persons, Agricultural Career, and Disavowance.
- Barriers to Enrolling – Personal Negative, Teacher Negative, Course Negative, Agriculture Negative.
- Opinions About Careers Related to Agriculture – Personal Career, Agricultural Occupations, Occupational Requirements.

The Agriculture scale measured how agriculture in general and the agricultural education program in particular influenced the students' decision to enroll in the course. The Disavowance scale had four items that measured the influence of factors beyond the students' control such as the scheduling problems and being required to take the class. The Influential Persons scale inquired about the influence of key persons such as parents, siblings, friends, counselors, and the agricultural education teacher. The Agricultural Career scale had items related to how the course might help the students' career pursuits related to agriculture.

The Personal Negative scale measured the influence of negative personal interests, and interactions with other students. The Teacher Negative scale had items that asked about discouraging interactions with agricultural education teachers ranging from indifference to discrimination by the teacher toward the student. The Course Negative scale measured the degree that course attributes were a barrier to enrolling. This included items about course difficulty, FFA activities, and vocational preparation. The Agriculture Negative scale inquired about the perceptions related to the pay, status, and physical demands of agriculture.

The Personal Career scale measured the likelihood of students' entering a career related to agriculture. The Agricultural Occupations scale measured students' perceptions regarding the variety and scope of careers in agriculture. Students were asked to indicate their agreement to statements about areas such as education, research, natural resources, marketing, and mechanics being associated with agriculture. The Occupational Requirements scale measured students' perceptions about requirements to obtain a job in agriculture.

A five-point Likert-type scale response choice was provided for each of the items in these scales. The scale ranged from Strongly Agree to Strongly Disagree. Talbert and Larke used Cronbach's alpha to determine the reliability of the instrument. The alphas for the scales ranged from .67 - .86.

FINDINGS

As expected, the ethnic composition of the respondent group differed from the ODVTE report. Since schools with high enrollment of Native American students were targeted, the sample had nearly twice as many respondents from that group than did the population. African-Americans, Hispanics, and Asians composed less than six percent of the respondent group. Table 1 is a display of these data.

Table 1
Ethnicity of Students

Ethnicity											
African American		Asian-American		Hispanic		Native American		White		Other	
n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
5	(2.03)	2	(0.82)	5	(2.03)	78	(31.70)	155	(63.01)	1	(0.41)

Respondents were asked to indicate the amount of their Native American heritage. Only one student reported being a "full blood" Native American. More than half of the Native American respondents reported that less than one-fourth of their ethnic heritage was Native American. These data are displayed in Table 2.

Table 2
Amount of Native American Heritage of Native American Students

Native American Heritage	Frequency	Percent
100%	1	1.2
75%	9	11.5
50%	8	10.2
25%	18	23.0
Less than 25%	42	53.8
Total	78	100.0

Almost two-thirds of the respondents were males. Nearly 68% of the Native American students were male compared with slightly more than 61% of the other respondents being male (Table 3).

Table 3
Gender of Native American and Non-Native American Students

	Gender			
	Males		Females	
Ethnicity	n	(%)	n	(%)
Native American	54	(67.94)	24	(32.06)
All others	103	(61.31)	65	(38.69)
Overall	157	(63.82)	89	(36.18)

A majority of the respondents (72.65%) reported that they lived on a farm or ranch or a rural area. Again, with the sample being purposefully selected, these data do not reflect the norm for agricultural education students statewide. Compared to other students, a lower percentage of Native American students resided on a farm or ranch or rural area (64.93%). Nearly 13% of the Native American students indicated they lived in small cities (communities with a population of 5,000 to 50,000 persons), compared with slightly fewer than 5% of the non-Native American students. None of the respondents reported that they lived in large cities of more than 50,000 people. These results were expected as none of the schools selected in the sample were in large cities. Differences between these groups were not statistically significant. See Table 4.

Table 4
Residence of Native American and Non-Native American Students

	Place of Residence									
Ethnicity	Farm/Ranch		Rural		Small Town		Small City		Large City	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Native American	29	(37.66)	21	(27.27)	17	(22.08)	10	(12.99)	0	(0.00)
All others	79	(47.02)	47	(27.98)	34	(20.24)	8	(4.76)	0	(0.00)
Overall	108	(44.08)	68	(27.67)	51	(20.90)	18	(7.35)	0	(0.00)

As shown in Table 5, nearly 13% of the fathers of Native American students had not received their high school diploma compared with more than 5% of the fathers of the other students. However, 6.50% of the fathers of Native Americans had earned an advanced college degree compared with fewer than four percent of the fathers of other students. The level of father's education was not significantly different between the two groups.

Table 5
Level of Fathers' Education of Native American and Non-Native American Students

	Level of Father's Education									
Ethnicity	< High School Diploma		High School Diploma		Associates or Tech School Degree		Bachelors Degree		Advanced Degree	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Native American	10	(12.98)	40	(51.95)	13	(16.88)	9	(11.69)	5	(6.50)
All others	9	(5.36)	106	(63.10)	24	(14.29)	23	(13.68)	6	(3.57)
Overall	19	(7.76)	146	(59.59)	37	(15.10)	32	(13.06)	11	(4.49)

Very little difference in the level of education of the mothers of Native American and other students were reported. More than one-third of the students' mothers had earned degrees above the high school level. As shown in Table 6, nearly 7% of the students reported that their mothers had an earned advanced college degree.

Overall, more than half (52.03%) of the students stated they had been or were members of 4-H. Only 33 of the 78 (42.31%) Native American respondents had ever been in 4-H, while more than 56% of the other students had been in the organization (Table 7). The differences between the two groups were not significant.

Table 6
Level of Mothers' Education of Native American and Non-Native American Students

	Level of Mother's Education									
Ethnicity	< High School Diploma		High School Diploma		Associates or Tech School Degree		Bachelors Degree		Advanced Degree	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Native American	6	(7.79)	44	(57.15)	17	(22.08)	4	(5.19)	6	(7.79)
All others	15	(8.92)	91	(54.17)	35	(20.84)	16	(9.52)	11	(6.55)
Overall	21	(8.58)	135	(55.10)	52	(21.22)	20	(8.16)	17	(6.94)

Table 7
Native American and Non-Native American Membership in 4-H

	Current or Previous membership			
	Yes		No	
Ethnicity	n	(%)	n	(%)
Native American	33	(42.31)	45	(57.69)
All others	95	(56.55)	81	(43.45)
Overall	128	(52.03)	118	(47.97)

Inspection of the data revealed that Native American students were more likely to enroll in agricultural education courses because of reasons beyond their control (Disavowance) compared to non-Native American students. As shown in Table 8, this difference was significant at the 0.05 level. While they were not significantly different, non-Native American students indicated that factors related to agriculture, agricultural careers, and the influential persons were more important to their enrolling in agricultural education courses.

Table 8
ANOVA of Students' Reasons for Enrolling Scale Scores by Ethnicity

Scale	Native American Heritage	Mean*	Standard Deviation	F Ratio	F Prob.
Agriculture	Yes No	4.0670 4.0909	.9378 .7965	.034	.854
Disavowance	Yes No	3.0023 2.7717	.6915 .7888	4.392	.037
Influential Persons	Yes No	2.9824 3.1526	.9380 .8822	1.638	.202
Agricultural Career	Yes No	3.8169 3.8952	.6971 .7604	.533	.466

- 1 = strongly disagree; 2 = disagree, 3 = neutral, 4 = agree; 5 = strongly agree.

There were no significant differences between the two groups on the scales used to measure barriers to enrolling in agricultural education courses. However, the mean for each scale (Personal Negative, Teacher Negative, Course Negative, and Agriculture Negative) for Native American students was lower than that reported by their counterparts. This indicates that these factors were slightly less important barriers to their enrollment for Native Americans than non-Native Americans. These data are displayed in Table 9. The mean responses for both groups on all four scales were within the real limits of the "disagree" category. However, the standard deviations for these means from Native American students were higher for these scales than any other scales in the study.

Table 9
ANOVA of Students' Barriers to Enrolling Scale Scores by Ethnicity

Scale	Native American Heritage	Mean*	Standard Deviation	F Ratio	F Prob.
Personal Negative	Yes No	2.0864 2.1131	1.0581 .8175	.034	.853
Teacher Negative	Yes No	1.9621 2.0922	1.0615 .9657	.758	.385
Course Negative	Yes No	2.0548 2.2260	1.0611 .9204	1.343	.248
Agriculture Negative	Yes No	2.0596 2.1038	1.0406 .9258	.092	.762

* 1 = strongly disagree; 2 = disagree, 3 = neutral, 4 = agree; 5 = strongly agree.

In general, both groups had positive perceptions related to agricultural careers. The means for the responses of Native Americans were in the "agree" range for all three scales used to measure this factor. Likewise, non-Native Americans agreed with statements on the Personal Career scale and Agricultural Occupations scale. However, their responses were neutral in regard to the Occupational Requirements scale. As shown in Table 10, the differences between the two groups of respondents were not statistically significant.

Table 10
ANOVA of Students' Opinions About Agricultural Careers Scale Scores by Ethnicity

Scale	Native American Heritage	Mean*	Standard Deviation	F Ratio	F Prob.
Personal Career	Yes No	3.8556 3.8872	.8871 .7729	.064	.800
Agricultural Occupations	Yes No	3.8808 3.8099	.7686 .7277	.416	.519
Occupational Requirements	Yes No	3.5060 3.4826	.7543 .6663	.052	.820

* 1 = strongly disagree; 2 = disagree, 3 = neutral, 4 = agree; 5 = strongly agree.

Comparisons were made between the sub-groups of Native American respondents based on the amount of their Native American heritage. There were no significant differences found for any of the variables among these groups. Further, Native American respondents with 100%, 75%, 50%, and 25% Native American heritage were grouped together and compared to those Native American students with less than 25% Native American heritage. Again, no significant differences between these groups were found on any of the variables.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were formulated based on the results of this study:

1. A large number of students who classify themselves as being of Native American heritage have less than one-fourth Native American blood.
2. There are few significant differences between Native American students and other students enrolled in agricultural education classes. Their parents have similar education levels and they reside in similar situations. While the majority of non-Native American students had been involved in 4-H, that was not the case with Native American students.
3. Native American student were more likely to feel they were in agricultural education classes because of circumstances beyond their control. This conclusion agrees with the findings of Talbert and Larke. Those researchers concluded that other minority students identify the same reason for enrolling in agricultural education classes.
4. Both groups disagreed with statements used to measure barriers to enrollment scales. This finding indicates that none of the barriers identified in this study would have prevented students from enrolling in agricultural education courses in the future.
5. Native American Students and other students had very similar positive perceptions about agricultural careers.

Based upon the aforementioned conclusions, the following recommendations were developed:

1. Because fewer Native American students had experience in 4-H programs, local agricultural education teachers should work with these and other school and community organizations and activities to expose these students to their programs. FFA educational and community service projects should target working with junior high and elementary school children of Native American heritage to show them the benefits of enrollment in agricultural education classes.

2. Because Native American students were more likely to enroll in agricultural education classes for "disavowance" reasons, teachers should discourage counselors from forcing students into agricultural education classes.
3. Research should be conducted to assess barriers to enrollment into agricultural education
4. classes as perceived by students not enrolled in agricultural education classes.
5. Research similar to this study should be conducted with Native American subjects in different cultural and educational settings. For instance, this research should be replicated at schools on Native American reservations in New Mexico and Arizona.
6. Further work should be conducted to identify other barriers to and factors for enrollment of Native American and other underrepresented groups in agricultural education programs.

REFERENCES

The Cherokee Culture Society of Houston. (1995). Is your grandmother a Cherokee princess? [Online]. Available HTTP: http://www.powersource.com/cherokee/gene.html

Committee on Agricultural Education in Secondary Schools, Board on Agriculture, National Research Council. (1988). Understanding agriculture: New directions for education. Washington, DC: National Academy Press.

Flores, R. A. (1989). A comparison of Hispanic and non-Hispanic students enrolled in programs of agricultural education in secondary schools in the South Coast Region of California. Unpublished doctoral dissertation. College Station: Texas A&M University.

Longstreet, W. S. (1978). Aspects of ethnicity. New York: Teachers College Press.

Morris, J.W., Goins, C. R., & McReynolds, E. C. (1991). Historical atlas of Oklahoma (3rd Edition). Norman, OK: University of Oklahoma Press.

National Summit on Agricultural Education. (1989). The strategic plan for agricultural education. [Brochure]. Washington, DC: Author.

Oklahoma Department of Vocational Technical Education, Information Services Division. (1998). 1997-1998 enrollment report for agricultural education. Stillwater, OK: Author.

Oklahoma Government Information Server. (1998). Oklahoma's history [Online]. Available HTTP: http://www.state.ok.us/osfdocs/stinfo.html.

Talbert, B. A. & Larke, Jr., A. (1993). Factors influencing minority and non-minority students to enroll in an introductory agriscience course in Texas.. Proceedings of the National Agricultural Education Research Meeting, 20, 23-30.

Vicenti-Henio, V. D. & Torres, R. M. (1997). Learning styles of Navajo students enrolled in secondary agricultural education. Proceedings of the National Agricultural Education Research Meeting, 23, 363- 371.

FACTORS INFLUENCING ENROLLMENT IN AGRICULTURAL EDUCATION CLASSES OF NATIVE AMERICAN STUDENTS IN OKLAHOMA

A Critique

James G. Leising
Oklahoma State University

This study addressed factors influencing Native American students to enroll in agricultural education courses. Low enrollment of ethnic minorities exists in secondary agricultural education programs in the US. This study is of particular importance in Oklahoma to understand what areas of the secondary agricultural education program may need to be adjusted to attract more Native American students.

The researcher did a good job of developing the theoretical framework for the research and describing why this study was important. Also, the purpose and objectives were clear.

The population of the study consisted of the 6500 students enrolled in Agriscience I in the 355 secondary Agricultural Education Programs in Oklahoma. A cluster sample method was used to sample from the population. A question that comes to mind immediately, will cluster sampling, conducted in the manner-described, produce a representative sample of Oklahoma Native American students enrolled in Agriscience I? It was stated that all schools (26) that had Native American enrollments of at least 40 percent of their total enrollment were included in the cluster sample. However, only 17 schools responded for a total of 246 student responses. Is 246-student responses (3.78% of the 6500) representative of the 6500 students enrolled in Agriscience I? Was cluster sampling used appropriately or would proportional stratified sampling of some other approach produce a sample that would have been more representative? Do Native American students enrolled in programs that have large numbers of non-Native Americans enrolled have different perspectives? Why were programs that had at least 40 percent Native American students enrolled used and others excluded?

Findings of the study were easy to understand and described appropriately. I particularly found conclusion number 2, "few significant differences existed between Native American students and other students enrolled in agricultural education classes," to be interesting and have implications for the agricultural education program in Oklahoma. Often studies have pointed out differences between minority and other ethnic groups. This study did not find this true for Native American students.

I question the inference of the statement in conclusion number 2, "While the majority of non-Native American students had been involved in 4-H, that was not the case with Native American students." The findings indicated, "more than half (52.03%) of the students stated they had been or were members of 4-H." "Only 33 of the 78 (42.31%) Native American respondents had ever been in 4-H, while more than 56% of the other students had been in the organization." "The differences between the two groups were not significant." Perhaps the wording of the conclusion leads the reader to assume greater differences then what was reported.

The recommendations were developed thoughtfully and were helpful in thinking about the next steps in research on this subject. Because few differences existed between the perceptions of Native American students and non-Native American students toward agriculture, I agree that it is important for additional studies to be conducted to determine if this conclusion has broad agreement

ERIC

NAERC '99

Research Fresh from Florida

Status of the Agriscience Education Program in the Southeastern United States

Larry Williams
Dade County High School

Maynard Iverson
University of Georgia

INTRODUCTION

Throughout the history of vocational agriculture/agricultural education, there have been many changes in both the quality and structure of programs. The program evolved as agriculture and society has changed. Some of the most recent changes involve curriculum shifts from traditional curriculum areas and titles to a more specialized and science-related curriculum. Sutphin (1992), reported on the gap that exists between agricultural and science education and the need for developing science-based agriculture.

In 1988, the National Research Council's Committee on Agricultural Education met to discuss the present condition and the future of agricultural education. As a result of their meetings, a document entitled; "Understanding Agriculture- New Directions for Education" was published. This comprehensive report looked at education in and about agriculture, projected what it should be in the future and compared it to the present status. Some astounding conclusions were drawn from this study. One that served as a catalyst for this study was a recommendation to incorporate more principles of science into high school agricultural education programs. Since the report, entire states have changed either their curriculum or the name of their curriculum (Williams, 1993), developed new curriculum, infused new ideas into old curriculum and developed workshops to help teachers reflect this new look (Newman & Johnson, 1994). Perhaps one of the most innovative and most researched programs as a result of this recommendation is the Biological Science Applications in Agriculture program developed in the State of Illinois (College of Agricultural, Consumer and Environmental Sciences, 1994).

ERIC

Even as the agriscience program began to unfold there was discussion on the origin of the word itself. Hillison (1996) looked at the origin of the word "science" to agriculture. His study indicated that science has been a part of agricultural education since its beginning. It was the work of the National Research Council, however, that brought the concept to the forefront and into national prominence.

Not only have new programs of agriscience begun to emerge, but a body of new research into the impact of agriscience on the agricultural education profession has also developed. Those studied have included science teachers (Osborne & Dyer, 1998), students (Parker & Herring, 1994), teachers (Rudd, 1994; Showerman, 1994), minority students (Tolbert, 1992), counselors (Osborne & Dyer, 1995) and agriscience students' science scores (Connors, 1992; Flanders, 1998). However, most of these studies have been limited to individual states or school systems, which brings into question how widely accepted the agriscience movement is and whether it will impact the future of agricultural education. Realistically, it must be recognized that not all agriculture teachers, teacher educators, administrators, guidance counselors, state supervisors and students welcome change with the same level of enthusiasm.

The problem addressed by this research was to determine the nature and extent of agriscience program development in the Southern Region, including the attitudes and involvement of teachers, teacher educators and state supervisors in the Southeast regarding agriscience.

PURPOSE AND OBJECTIVES

The primary purpose of this study was to assess the impact of agriscience on the agricultural education program in the Southeastern United States. Specific objectives were to:

1) determine the characteristics of those involved in agriscience instruction;
2) ascertain the nature and extent of agriscience instruction across the Southeast;
3) learn the attitudes held by local, district and state personnel regarding agriscience;
4) find out the perceptions of program personnel regarding implementation of agriscience;
5) assess the factors involved in offering agriscience and giving science credit.

PROCEDURES

This study utilized a descriptive, *ex post facto* research design. The population for the study was teachers, teacher educators and supervisory personnel associated with agricultural education programs from the 10 Southeastern states of Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee and Virginia.

An extensive review of literature failed to reveal a data-gathering instrument that could be used for the study; therefore, the authors designed an instrument. A preliminary draft of the questionnaire was mailed to 82 randomly chosen Georgia teachers of agriculture for the purpose of determining the validity of the instrument. Returned comments and data were used to construct the final instrument. The questionnaire was mailed to a stratified random sample of individuals from ten states. Every tenth name on lists of agricultural education personnel provided by state departments of education was chosen to receive the initial questionnaire. Two follow-up mailings

ERIC

were also conducted. The first follow-up was a post card reminding the person of the importance of the research. A second follow-up was conducted by sending a new instrument and cover letter. As can be seen in Table 1, a total of 161 respondents returned their questionnaires, for a return rate of 54%. A statistical comparison was made of responses from the first and subsequent mailings; no significant differences were found between early and late respondents, therefore the data were combined, with the assumption that the respondents were from the same population (Miller & Smith, 1983).

ANALYSIS OF DATA

Data were transferred to a word processing program and analyzed by the Academic Computing Service at the University. Primarily descriptive statistics were used, including frequencies, means, standard deviations and percentages. ANOVA was used to determine statistical differences between variables. The level of significance was set *a priori* at .05. Cronbach's alpha was used to determine reliability of the instrument; the .85 achieved on 17 Likert-type variables indicated a moderately high reliability for the questionnaire.

RESULTS

Characteristics of respondents

The majority of respondents were teachers of agriculture/agriscience (102 or 63.4 %); teacher educators comprised the next largest group (28 or 17.4%); state, district and local administrators made up the next largest group (18 or 11.2%); and "other" was the classification of just six (3.7%). Agricultural education teachers who responded had typically taught more than 10 years; the largest group taught from 11 to 20 years (38%) while the second largest had 21-plus years of experience (31%). Of those responding from the supervisor/teacher education categories, the typical respondent had from one to ten years of experience (43%).

Table 1

Frequency and Percentage of Response by State (N=161)

State	Frequency	Percentage
Alabama	17	10.6
Florida	23	14.3
Georgia	17	10.6
Kentucky	20	12.4
Louisiana	18	11.2
Mississippi	14	8.7
North Carolina	15	9.3
South Carolina	3	1.9
Tennessee	16	9.9
Virginia	18	11.2
TOTAL	161	100

More respondents indicated that the emphasis of their program was agriscience than any other area. These data can be seen in Table 2. Respondents indicated a high level of satisfaction with their current programs; 60.7 percent were in the satisfied range, of which 17.9% were very satisfied.

When asked whether or not science credit was being granted, 60 or 39% of the respondents said that science credit was being granted by their state already. Of the remainder, 59 or 38.3% indicated their state was not offering science credit. Another 35 or 22.7% indicated they did not presently offer science credit but were attempting to obtain it. In answering a question regarding perceived knowledge of the area, 109 or 72% felt that they had either a high or very high knowledge level of agriscience. Also, when questioned about their familiarity with the missions and purposes of agricultural education, 156 or 97% felt that they had at least a moderate level of familiarity.

The academic level of students they are teaching often reflects teachers' attitudes. Three out of four respondents (77%) indicated that their students were average or above average in academic level; however, 23% said that their students were below or well below average in academic achievement. When almost one-fourth of the programs are enrolling a majority of their students at the below average level it is understandable that these teachers would be skeptical about a highly science-oriented curriculum.

ERIC

Table 2

Major Emphasis of Programs Reported by Respondents

Area	Frequency	Percentage
Agriscience	29	18.0
Production Agriculture	26	16.1
Horticulture	25	15.5
Agricultural Mechanics	21	13.0
Other	19	11.8
Agribusiness	6	3.7
Total*	135	100

*Note: 9 respondents (11.8%) indicated that the question "did not apply".

Attitudes toward agriscience and its impact

As a group, the respondents indicated an overall favorable attitude towards agriscience. Most of the respondents (60.7%) indicated a level of satisfaction with their current program in the satisfied range; 17.9% were very satisfied. Newman & Johnson (1996) indicated similar results in a Mississippi study. In this study 72.8% of the respondents indicated a positive attitude towards the agriscience movement. In a question on the importance of the role of agriscience in the high school curriculum, 86.1% of the respondents felt that agriscience was either important or very important. A large majority (80.1%) of the respondents also approved of offering science credit for certain agriscience courses. Johnson & Flowers reported similar results in 1996. Eight out of ten (88%) of the respondents in the Southeast placed either a high or very high level of importance on agricultural education. Respondents also placed a high level of importance (88%) on agricultural education in the role of educating youth for the next ten years.

When the responses of teachers with different levels of experience were compared with the perceived impact of the agriscience program on the level of student enrollment, a significant difference at the .028 alpha level was discovered. This indicates that the level of experience in the classroom has some bearing on the perceived impact of new program philosophies such as agriscience.

Respondents felt that the agriscience program would have a generally positive impact upon most areas of the agricultural education program (Table 3). An exception was in the area of new teacher recruitment. The respondents indicated that this new direction would not attract as many students as the original program. When compared by level of experience, respondents also indicated that the agriscience program would have the most impact in the areas of student enrollment and SAEP programs.

Table 3

Impact of Agriscience on Program Areas, as Perceived by Respondents (N=136)

Program area	Negative impact (n)	Neutral impact (n)	Positive impact (n)
FFA	5	27	104
Community Perception	1	31	112
SAEP	13	46	78
Administrator Acceptance	5	34	97
Contest Participation	15	44	78
Student Enrollment	9	30	95
New Teacher Recruitment	7	68	58

When comparing attitudes based upon level of support received (Table 4), the majority felt as if they were receiving support. Two examples where differences occurred were in perceived level of support from state departments and national agencies. When statistically compared by program area and by state there was also a significant difference. Comparison of major program areas indicated a significant difference in the level of support from national agencies (p=.004). When compared by states, there was a significant difference in perceived level of support from state departments (p=.042) and a significant difference in perceived level of support from university personnel (p=.004). These program area differences could be expected, since different program areas have varying levels of scientific principles in the individual course. As to the differences among states, a study by Williams (1993) of all fifty states indicated a large degree of difference in the involvement level in agriscience. By reviewing curricula received from state departments and universities, it was apparent that some states made sweeping changes in their curriculum, as in the example of the Illinois BSAA curriculum. Other states merely changed existing course names. Differences between states may be reflected in the attitudes of personnel.

Courses included in agriscience and granted science credit

Table 4 indicates that the majority of respondents favored plant and animal science as the top two courses to offer in an agriscience curriculum. The least desired courses to offer were tissue culture and aquaculture. Given the national promotion of aquaculture and the emphasis on the level of science involved in such a course, this discovery was surprising. There is possibly a preference for courses based upon level of familiarity with course content and knowledge level of those teaching such a course. The only significant item discovered in a comparison of states was with food science. This difference could have been the result of sampling error or the difference in emphases by individual states.

ERIC Full Text Provided by ERIC

Table 4

Ranking of Courses by Level of Benefit to Students

Courses	Ranking*	Respondents
Plant Science & Biotechnology	1	134
Animal Science & Biotechnology	2	132
Environmental Science	3	129
Agriscience (General)	4	127
Computers in Agriculture	5	123
Biological Science Applications in Agriculture	6	122
Natural Resources	7	118
Food Science	8	112
Biotechnology	9	103
Physical Science Applications in Agriculture	10	97
Small Animal Management	11	90
Aquaculture	12	78
Tissue Culture	13	71

*Note: Areas are ranked from highest to lowest based on selection of "beneficial" and "very beneficial" categories.

Respondents tended to rank both the benefits to the student and courses to grant science credit about the same. Horne and Key (1993) completed a study on the benefit of biotechnology to the high school student. They reported similar results, with biotechnology rated as an important course for the high school student.

When comparing courses to be granted science credit by other factors, several significant items were discovered. One of these comparisons involved the five levels of experience (see Table 6). It is unclear why this difference existed between the experience levels. There is a possibility that the less experienced professionals received more training in agriscience and related areas, which could account for the difference in attitude. The more experienced teachers grew up with and taught in traditional programs, resulting in stronger ties to these courses.

ERIC

Table 5

Courses to be Granted Science Credit (N=161)

Course	Frequency	Percentage	Ranking
Plant Science	116	72.0	1
Animal Science	111	68.9	2
Agriscience	111	68.9	2
Biological Science Applications in Agriculture	110	68.3	3
Biotechnology	105	65.2	4
Natural Resources	69	42.9	5
Food Science	61	37.9	6
Aquaculture	54	33.5	7
Tissue Culture	50	31.1	8
Small Animal Management	30	18.6	9
Other	12	7.5	10
None	1	.6	11

Table 6

Comparisons of Respondents with Five Levels of Experience on Whether to Grant Science Credit

GROUP	Sum of Squares	df	Mean Square	F	Sig.
Aquaculture	2.747	4	.687	2.985	.021*
Biological Science Applications	2.633	4	.658	3.095	.071 n.s.
Plant Science	2.195	4	.549	2.722	.032*
Animal Science	4.360	4	1.090	5.407	.000**

* Significant at .05 level; ** Highly significant

Preference of whom should teach agriscience.

The matter of who should teach agriscience was answered by two closely related questions: A. Who you think should teach agriscience? and B. What is your preferred approach to integrating agriscience into the high school curriculum? The results may be viewed in Table 7.

Table 7

Preferred Choice of Personnel to Teach Agriscience (N=159).

Personnel	Frequency	Percentage
Science Teacher	2	1.2
Agricultural Education Teacher	110	68.3
Team Taught	45	28.0
Other	2	1.2

From Table 7 it was apparent that two out of three respondents favored agriscience being taught by agricultural education teachers. There were another 28% who thought that the course should be team-taught. The two respondents who checked "other" stated that agriculture teachers should teach it only if they are certified in science. As to the implementation process for such a program or course, Table 8 demonstrates a mixture of opinions.

Table 8

Preferred Approach to Implementing Agriscience into the Curriculum (N=161).

Preferred approach	Frequency	Percentage
New Program- New Directions	29	18.0
Supplement to present courses	57	35.4
Other	5	3.1
Both New program & supplement	62	38.5
No response	8	5.0

Interestingly, there was almost an even split between those who chose the route as a supplement to the present courses and those who favored it to be both a supplement and a new program. They may have felt that agriscience should be infused into the present courses while at the same time teachers were developing new programs/directions. Williams (1993) in an unpublished study, determined that there are programs throughout the nation that span the spectrum of choices.

Responsibility for agriscience curriculum development

Agricultural educators and those related to the profession are highly independent individuals involved in a profession with a unique curriculum. Thus most of the respondents favored keeping curriculum development in-house with individual teachers, state departments or university professors being responsible for its development. The only significant difference discovered was in comparison by states. Among states, significant differences were found in choice of textbook companies ($p=.017$) and university professors ($p=.029$). This difference could be attributed to sampling error or it could simply be the fact that states approach curriculum development in different ways. Table 9 indicates the overall breakdown of how respondents felt about this issue.

Factors determining whether agriscience is taught

In any new program area, it is important to determine the factors that would influence individual teachers to teach the curriculum. One question in this study was designed to address this issue. However, the only significant factor was among states. This could be the result of the varying emphasis by individual states on the agriscience curriculum. When the frequency of responses were compared, all factors were close in comparison. Of the top three, funding was the most frequent response, followed by lack of administrative support and lack of support from guidance (Table 10). Rudd and Hillison (1995) reported the importance of teacher knowledge level as a determining factor. Their study dealt with this area as the primary issue. In this regional study, however, knowledge level ranked among the lowest reasons for choosing not to teach agriscience. Moreover, the respondents felt comfortable with their current knowledge level.

Table 9

Curriculum Development Responsibility Perceived by Respondents (N=159)

Responsible agent	Frequency	Percentage
Individual teachers	89	56.0
State Department	73	45.9
University professors	63	39.6
State hired professionals	28	17.6
Textbook companies	14	8.8
Other	14	8.8
Independent contractors	10	6.3

Table 10

Determining Factors in Teaching Agriscience (N=161).

Determining factor	Frequency	Percentage
Lack of funding	20	12.4
Lack of administrative support	16	9.9
Lack of support from guidance	13	8.1
Lack of student interest	12	7.5
Lack of knowledge	11	6.8
Lack of curriculum	10	6.2

Note: 50 respondents indicated "Does not apply"

CONCLUSIONS

The majority of those involved with agricultural education in the Southeast had a positive attitude towards agriscience and its impact upon the agricultural education program. Most of the teachers felt that this program would be beneficial to their students; however, there were several differences of opinion in regard to the support received and in the level of students. Some teachers were very vocal in their comments about their programs being a "dumping ground" and about their lack of support from guidance. It is generally agreed that agricultural educators must attempt to meet the needs of all students; however, it must also be recognized that above-average students must also be recruited as future agriscience professionals. These conclusions tend to agree with previous research (Osborne & Dyer, 1998; Rudd, 1994; Showerman, 1994 and Osborne & Dyer, 1995).

Plant and animal science received the highest ratings for secondary school agriscience curriculums. The Illinois BSAA (CACES, 1994) curriculum was rated third for science credit. Most teachers believed that science credit should be offered for some agriscience courses. This was similar to other studies found in the literature.

There was little doubt left in this study as to the respondents' preference of who should teach agriscience-- agricultural educators were the preferred deliverers in two out of three cases. There was also a high degree of interest in the agriscience curriculum from personal contacts through the National Science Teachers Association.

As to curriculum development preferences, most of the respondents favored the development being done by individual teachers. The least favored method was development by textbook companies.

Funding was the top reason cited by educators for not teaching agriscience. Other reasons were lack of support from administration, guidance or students.

RECOMMENDATIONS

Based on the findings and conclusions of this study, the following recommendations are made:

1. Program leaders in the southeastern states should consider this study when planning for development of agriscience programs.
2. A follow-up study should be conducted in the region to more accurately determine the academic level of students enrolled in agricultural education.
3. Science credit for agriscience courses should be pursued in the states represented in this study.
4. Effort should be made in the states represented in this study to add more agriscience-oriented proficiency awards, contests, SAEP, and FFA activities.
5. A list of available agriscience curriculum materials should be published and disseminated widely.
6. A program should be developed that will allow teachers and students to partner/team up with professionals in various agriscience-related professions for professional development and student agriscience research.

REFERENCES

Connors, J. & Elliot, J. (1992). Teacher perceptions of agriscience and natural resources curriculum. Journal of Agricultural Education, Volume 35, No. 4, 15-19.

Dyer E. & Osborne, E. (1995). A factor analysis of attitudes of Illinois guidance counselors toward agriculture programs. Proceedings of the annual national agricultural education research meeting. Volume XXII.

Flanders, F. (1998). Agriscience Student Scores on Science Exit Exams in Georgia. Paper Presentation at the Georgia Vocational Agriculture Teachers Association Summer Conference, Jekyll Island, GA.

Hillison, J. (1996). The origins of agriscience: or where did all that scientific agriculture come from. Journal of Agricultural Education. Vol. 37, No 4, 8-13.

Horne, J. & Key, J. (1993). Evaluation of the pilot testing of the biotechnology in agriculture curriculum in Oklahoma. Proceedings of the Annual National Agricultural Education Meeting. 58-65.

Illinois Biological Science Applications in Agriculture. College of Agricultural, Consumer and Environmental Sciences, The University of Illinois.

Johnson, D. & Flowers, J. (1996). Science credit for agriculture: Perceptions of Arkansas agriculture teachers. Proceedings of the 1996 National Agricultural Education Research Meeting, Vol. XXIII, pp. 136-148.

Miller, L. E. & Smith, K. L. (1983). Handling nonresponse issues. Journal of Extension, XXI, September/October.

National Research Council (1988). Understanding agriculture: New directions for education, Washington , DC; National Academy Press.

Newman, M. E. & Johnson, D. M. (1996). Perceptions of Mississippi secondary agriculture teachers concerning pilot agriscience courses. Proceedings of the 1996 National Agricultural Education Research Meeting, XXIII, 19-27.

Osborne, E. W. & Dyer, J. E. (1998). Attitudes of Illinois high school science teachers toward educational programs in agriculture. Journal of Agricultural Education, Vol. 39, No 1, 8-16.

Rudd, R. D. & Hillison, J. H. (1995). Teacher characteristics related to the adoption of agriscience curriculum in Virginia middle school agricultural education programs. Journal of Agricultural Education, V36, N2, 19-27.

Showerman, R. J. (1994). Michigan agriscience teachers' perceptions of the impact of the standards for excellence on restructuring local agriscience programs, Dissertation Abstracts.

Sutphin, D. (1992). Teaching the science of agriculture, Agriculture Education Magazine, v65, n4, 3-18.

Talbert, L. (1993). Factors influencing minority and non-minority students to enroll in an introductory agriscience course in Texas. Proceedings of the Annual Southern Regional Agricultural Education Research Meeting. April 1993.

Williams, L. (1993). Correspondence with a national sample of state leaders in agricultural education regarding the agriscience curriculum. Unpublished staff study.

STATUS OF THE AGRISCIENCE EDUCATION PROGRAMS IN THE SOUTHEASTERN UNITED STATES

A Critique

James G. Leising
Oklahoma State University

The purpose of this study was to assess the impact of agriscience on the agricultural education program in the Southeastern United States. The objectives were broad and sought to determine demographic characteristics, the nature and extent of agriscience instruction, attitudes and perceptions of personnel toward agriscience and assessed factors involved in offering agriscience and providing science credit. A theory base for the study was established, but no definition for the term agriscience was noted. What is the meaning of the term agriscience? It appeared that this definition was important to understanding this study.

This was a descriptive study and the population for the study was agriculture teachers, teacher educators and supervisory personnel of the agricultural education programs in ten Southeastern states. It was not clear how many individuals composed the population or the number that needed to be sampled from the population to be representative. However, the researchers indicated that every tenth name on a list of agricultural education personnel was used to select a stratified random sample. The rationale for randomly selecting every tenth name would be helpful to the reader. Also, how many respondents were needed to have a representative sample? It was reported that 161 people responded. It would have been helpful to learn if the respondents in each group were proportional to the population studied.

The procedures used by the researchers to insure content validity and reliability of the questionnaire were unclear. It was reported that the questionnaire had been sent to randomly chosen agricultural teachers in Georgia to determine validity. Were teacher educators and state supervisory staff also consulted? How was reliability of the instrument determined?

Findings were reported by total number of respondents for each objective and no comparison between groups of respondents was done. This was appropriate since comparisons between groups were not one of the objectives. However, I do wonder if the groups have different perceptions of the impact of agriscience on agricultural education programs. Some of the questions that teacher educators and state supervision staff members were asked to respond too, such as the perceived academic level of students they are teaching and the subject matter emphasis of their program, appeared to be difficult to answer because they do not teach secondary students and could only report general perceptions. Also, more explanation is needed to understand the rationale used by respondents in ranking courses based on benefits to students. What were the benefits referring too, high school graduation credit, increasing science test scores, being better prepared for a job after high school, etc.?

Conclusions indicated that agricultural educators in the Southeast had a positive attitude toward agriscience and its impact on the agricultural education programs. It was helpful to learn that the conclusion of this study agreed with the conclusions of similar studies in the Central Region.

Based on the findings of this study it is apparent that agriscience is perceived as an important component of agricultural education programs in the Southeastern US. The next step is to assess impact of agriscience instruction on students to determine what students are learning and how education in agriscience can be improved.

ERIC Full Text Provided by ERIC

NAERC '99

Research Fresh from Florida

Intentionality, Perceptions, and Practices of High School Counselors Regarding Agriculture, Agricultural Science Programs, and Agricultural Science Teachers in Texas

Dan Jackson
Methodist Children's Home

Don Herring
University of Arkansas

Gary Briers
Texas A & M University

INTRODUCTION/THEORETICAL FRAMEWORK

Comprehensive programs of guidance and counseling are the umbrella programs of our times designed to provide students with needed life competencies through personal and career counseling (Gysbers & Guidance Program Field Writers, 1990). Schools, being challenged today to integrate basic skills, recognize the critical role that counselors play in helping students plan a demanding sequence of academic and vocational courses to prepare them for employment and for higher education (Feller, Daly, & Smeltzer, 1994).

Counseling has evolved into an integral and important part of our educational system (Baker, 1996). The counselor is in an influential and controlling position regarding the future of the student. School counselors have much influence in determining the courses in which students enroll in high school, and they influence the career decisions of adolescents (Sproles, 1988; Lotto, 1985; Bottoms, Presson, & Johnson, 1992; Dyer, 1994). There is evidence, however, that some school counselors are biased against vocational courses and may use vocational programs as

"dumping grounds" for less capable students perceived as not being college material (Bottoms, Presson, & Johnson, 1992; Lotto, 1985). Counselors often encourage the conventional academic route over the vocational route (Lewis & Kaltreider, 1976), and have been accused of neglecting the vocational or "other" student, which includes the agricultural science student (Bottoms, Presson, & Johnson, 1992). The literature also suggests that vocational students may not get as much attention as "academic" students (Bottoms, Presson, & Johnson, 1992; Lotto, 1985; Gray & Herr, 1995; Hull & Parnell, 1991; Parnell, 1985; W. K. Kellogg Foundation, 1985).

These factors and several studies conducted in other states gave rise to the need to assess high school counselors' intentionality, perceptions, and practices in Texas. Six other studies (none in Texas) were found that dealt specifically with measuring attitudes, perceptions, and practices of high school counselors: Matulus (1989) in Illinois, Thompson (1989) in Illinois, English (1991) in Arizona, McGhee (1974) in West Virginia, Woodard and Herren (1994) in Georgia, and Dyer (1994) in Illinois. All reported a lack of knowledge of agriculture on the part of counselors and a need for better communication. Attitudes/perceptions were mixed about agriculture and agricultural education programs. Dyer (1994) studied counselors in Illinois and recommended studies to update the knowledge base concerning the attitudes of counselors and their influence on agricultural science programs. Dyer reported that a lack of knowledge on the part of many counselors pertaining to agricultural careers, salaries, university graduates, and course difficulty found them ill-prepared to provide the proper guidance and counseling needed by their students.

The impact of school counselors on agricultural science students in Texas was not known. Their perceptions of agriculture, agricultural science programs, and agricultural science teachers were not known, nor how these perceptions affected their guidance practices. Therefore, this was the problem addressed in this study.

The theoretical framework for the study was based on perception and intentionality. Ballard (1983) described perception as a distinction between what is given and what the perceiver adds to the given in the process of coming to an understanding of it. Thus, the processes of "presentation" and "interpretation" are used. May (1969) believed that we cannot perceive until we can conceive and that intentionality is the "bridge" that brings the two together. The bridge of intentionality is a mapping process, according to Millikan (1997), that goes on between the processes of presentation and interpretation. Thus, this study, in investigating intentionality, examined the relationships between the presentations (agriculture, agriculture science programs, and agriculture science teachers in the state of Texas) as they are held by the counselors and their interpretations (counseling practices as perceived and reported by their clients {students}). Allport (1955) said that perception psychology is used to explain social adjustments such as stereotypes. Millikan (1997) made reference to the influence of stereotypes in intentionality. Thus, the theoretical framework was used to investigate what could be sources of stereotyping and stereotypes leading to biases in intentionality of high school counselors. Intentionality was tested by comparing counselors' perceptions of agriculture, agricultural science programs, and agricultural science teachers to their practices as perceived by their clients (students).

PURPOSES/OBJECTIVES

One purpose of this study was to determine selected personal characteristics of high school counselors and their perceptions and practices in relationship to agriculture, agricultural science programs, and agricultural science teachers in the secondary schools of Texas. Another purpose was to explore the intentionality of school counselors by examining relationships between the perceptions of counselors regarding agriculture, agricultural science programs, and agricultural science teachers and the practices carried out by these counselors, as perceived by their student clients. The objectives developed to accomplish these purposes were as follows:

1. Describe personal characteristics of the high school counselors and high school seniors included in Texas.
2. Determine perceptions of Texas high school counselors toward agriculture, agricultural science programs, and agricultural science teachers.
3. Examine relationships between selected personal characteristics of school counselors and their perceptions regarding agriculture, agricultural science programs, and agricultural science teachers.
4. Determine practices conducted by Texas high school counselors in regard to suggested guidance activities.
5. Examine relationships between perceptions of school counselors and practices carried out by counselors as perceived by their student clients.
6. Examine relationships between perceptions of school counselors and the value of the overall guidance program as perceived by their student clients.

METHODS/ PROCEDURES

Design, Population, and Sample

The study used a causal-comparative design, also called the ex-post facto design. The target population was all high school counselors in Texas (approximately 3200) and all senior students enrolled in the spring of 1997 in an agricultural science course in schools in Texas offering an agricultural science program (approximately 10,000). Krejcie and Morgan (1970) suggested that a sample of 370 individuals was needed to satisfy the required sample size for an estimated population of ten thousand. A random cluster sampling technique was used with the agricultural science program as the cluster. Fifty (50) schools were chosen to participate. The cluster sample of 50 schools produced a sample of 428 students and 96 counselors.

Instrumentation

Two survey instruments were used to collect the data for this study: one for counselors and one for students (Jackson, 1997). The student instrument contained three parts. Part one contained eight questions inquiring about students' personal characteristics. Part two contained 34 questions assessing students' perceived experience with their high school counselor(s). Part three was designed to determine students' assessment of the overall guidance program in the school. The counselor instrument contained three parts. Part one contained 13 demographic questions. Part two was designed to assess counselors' perception of agriculture. Part three was designed to assess counselors' perception of the agricultural science program and the agricultural science teacher. Both instruments used a five-point agree-disagree response scale. Groups

ERIC

similar to those comprising the sample were used to pilot test the instruments to establish instrument validity. Scales were evaluated for internal consistency using the SPSS procedure RELIABILITY (SPSS, Inc. 1993). Cronbach's alpha coefficients ranged from .73 to .89.

Data Collection and Analysis

Data collection began in January, 1997 and ended on April 15, 1997. Agricultural science teachers administered student questionnaires. Questionnaires were mailed directly to the counselors at the selected schools. School response for students was 78% and response for counselors was 65%. Comparing early respondents to late respondents checked non-response bias. According to Miller and Smith (1983), non-respondents are assumed to be similar to late respondents. Using the number of days elapsed between mail-out and return of the questionnaires as a predictor variable, regression analysis revealed no evidence of non-response bias. Using the Statistical Package for the Social Sciences Release 6.1 (SPSS Inc., 1993), the researchers computed descriptive statistics to analyze data for objectives 1, 2, and 4 and appropriate correlational statistics to analyze data for objectives 3, 5, and 6.

RESULTS/FINDINGS

Objective One

An analysis of the demographic data revealed counselor gender as 82.3% female, with slightly more than one-half (50.8%) between the ages of 41 and 50 years. Years of counseling varied with 67.7% of the counselors having less than 10 years of experience. A large majority were Anglo (78.7%) with African American making up 9.8% and Hispanic 11.5%. Only 16% had a son or daughter who had taken an agricultural science course.

Counselors' responses to vocational and agricultural background questions are presented in Table 1. Counselors were asked about their generational agricultural involvement. A majority (51.7%) were either currently involved with agriculture or their parents were involved.

Table 1.
Counselors' Vocational and Agricultural Background

	Certified Vocational Counselor?	Vocational Education Teaching?	Agricultural Science Teaching?	Agricultural Work Experience?	Agricultural Courses Taken H/S or College?
Yes	21.3%	17.7%	0%	32.3%	6.5%
No	78.7%	82.3%	100%	67.7%	93.5%

Male students made up 73.4% of the sample. A majority were Anglo (70%); Hispanics made up 20.4%, and African Americans, slightly over 5%. A majority (63%) reported taking between three and eight agricultural science courses while in high school. Almost half of the students lived in a household involved directly in agriculture, with 19% of those living on a farm or ranch and 25.8% living in a rural area but not associated with agriculture.

Students' career plans were assessed. Almost forty percent (39.5%) planned to attend a four-year college, while 28.7% planned to attend a junior/community college and 10.7% a vocational/trade school. Others planned to go directly into the workforce (12.6%) or into the

military (8.4%). Students were asked whether or not they planned a career in agriculture; 48.4% answered in the affirmative.

Objective Two

Counselors' perceptions of agriculture, the agricultural science program, and the agricultural science teacher were measured. To accomplish this, three constructs were established from items in the instrument. In measuring counselors' perception of agriculture, a low mean score represented a positive perception and a high mean score represented a negative perception. Six-descriptors were used for reporting these perceptions: positive, moderately positive, slightly positive, and slightly negative, moderately negative, and negative. The counselors' mean perception of agriculture was moderately positive, while their mean perception of the agricultural science program was slightly positive, and their mean perception of the agricultural science teachers was moderately positive.

Objective Three

Relationships between selected personal characteristics of high school counselors and their perceptions regarding agriculture, agricultural science programs, and agricultural science teachers were examined. Correlations were used to quantify these relationships, and associations were described using terms suggested by Davis (1971): .70 and higher equal a high correlation, .50 to .69, substantial, .30 to .49, moderate, .10 to .29, low, and .01 to .09, negligible. Because the "experimental units" numbered only 30, an alpha level of .10 was used to determine statistically significant correlations.

No statistically significant correlations were found between any of the counselor perceptions and the following variables: gender, age, ethnicity, years of counseling experience, years of classroom teaching experience, whether or not the counselors held vocational counselor certification, whether or not the counselors had taken an agricultural course in high school or college, whether or not the counselors had agriculturally related work experience, and size of town/city where the school was located.

Two variables were statistically significantly correlated with perception of agriculture. The counselors' perception of agriculture was correlated with whether or not the counselor had teaching experience in vocational education (other than agriculture science). There was a moderate association (.39, $p = <.05$). Those with teaching experience in a vocational program had a more positive perception of agriculture. Counselors were asked to report the last known generation of their family which was involved in agriculture. Then, the association of "generational proximity" to agriculture and counselors' perceptions of agriculture was examined. There was a moderate association (.31, $p=<.05$), indicating that those counselors least removed from agriculture had the most positive perception of agriculture.

Objective Four

Practices of Texas high school counselors regarding suggested guidance activities as perceived by their student clients were examined. Again, the six-point scale was used for describing these perceptions: positive, moderately positive, slightly positive, and slightly negative, moderately negative, and negative.

ERIC

The practices of counselors were grouped into four conceptual areas, analyzed as scales, and named as follows: *Students' Perception of Counselors' Career Counseling, Students' Perception of Overall Benefit and Support of the Counselor, Students' Perception of Counselors' Support of the Agricultural Science Program,* and *Students' Perception of Counselors' Post Secondary Educational Counseling.*

Analysis of the data revealed slightly positive student perceptions in areas of counselors' career counseling and counselors' overall benefit and support and slightly negative student perceptions in the areas of counselors' support of the agricultural science program and post secondary educational counseling. Subsequent analysis was done on each of the questions making up the scales. Some of the findings thought significant by the researchers were as follows:

1. Students described their counselors favorably as follows:
   (1) the counselor was well liked and considered to be a friend of the students;
   (2) the counselor stressed good work habits;
   (3) the counselor was supportive of my interest in agriculture;
   (4) the counselor was knowledgeable of the agricultural science program;
   (5) the counselor was available when needed;
   (6) the counseling I received was consistent with my desire and potential; and
   (7) the counselor helped me with college applications, scholarships, and financial aid applications.
2. Students' mean scores were relatively low when responding to:
   (1) my counselor recommended taking an agricultural science course;
   (2) the counselor was knowledgeable of agriculture in general;
   (3) the counselor helped me identify life goals; and
   (4) the counselor helped me gather information about careers after high school.

Objective Five

Intentionality of counselors was investigated by examining relationships between the counselors' perceptions of agriculture, agricultural science programs, and agricultural science teachers and the perceptions of students concerning their counselors' career counseling, overall benefit and support, support of the agricultural science program, and post secondary educational counseling. Table 2 presents these findings.

There were moderate (Davis, 1971), statistically significant correlations between two sets of variables: (1) counselors' perception of agriculture and students' perception of counselors' support of the agricultural science program ($r = -.34$, $p = .06$), and (2) counselors' perception of the agricultural science teacher and students' perception of counselors' support of the agricultural science program ($r = .34$, $p = .07$).

Table 2.
Relationships of Counselors' Perceptions of Agriculture, the Agricultural Science Program, and Agricultural Science Teachers and Students' Perception of Counselors' Career Counseling, Overall Benefit and Support of the Agricultural Science Program, and Post Secondary Educational Counseling, n = 30

Counselors Perception of: → Students' Perception of: ↓	Agriculture	Agricultural Science Program	Agricultural Science Teacher
Counselors' career counseling	r = -.23 p = .22	r = .09 p = .64	r = .28 p = .13
Overall benefit and support of counselor	r = -.12 p = .53	r = .04 p = .82	r = .29 p = .11
Counselors' support of the agricultural science program	r = -.34 p = .06	r = .12 p = .53	r = .34 p = .07
Counselors' post secondary educational counseling	r = -.29 p = .11	r = .02 p = .93	r = .29 p = .11

r = Correlation Coefficient, p = 2-tailed Significance

Objective Six

This objective was also to investigate counselors' intentionality. Relationships between counselors' perception of agriculture, the agricultural science program, and the agricultural science teacher and the students' perception of the overall guidance program were examined. Here again, there was one statistically significant correlation (r = .31, p = .09) between counselors' perception of agricultural science teachers and students' perception of the overall guidance program. Table 3 shows the relationships.

Table 3.
Relationship of Counselors' Perceptions of Agriculture, the Agricultural Science Program, and Agricultural Science Teacher and Students' Perception of Overall Guidance Program; n = 30

Counselors' Perception of: → Students' Perception of: ↓	Agriculture	Agricultural Science Program	Agricultural Science Teacher
The overall guidance program	r = -.24 p = .19	r = .19 p = .31	r = .31 p = .09

r = Correlation Coefficient   p = 2-tailed Significance

CONCLUSIONS/IMPLICATIONS/RECOMMENDATIONS

CONCLUSIONS/IMPLICATIONS

The following conclusions and implications were drawn from the major findings of the study:

1. Counselors were likely to be female, Anglo, between the ages of 41 and 50 and have between five and nine years of experience. They were unlikely to be certified as a vocational counselor, or have experience teaching in a vocational field. Even though only one generation removed from agriculture, most had no agriculturally related work experience or any formal education in agriculture. Generally, they did not support agricultural education for their sons and daughters.
2. Senior students in agricultural science courses were predominately male and Anglo. Their parents were closely associated with agriculture. They, as a majority, planned post secondary education and almost half of them planned a career in agriculture.
3. As a group, counselors had a moderately positive perception of agriculture and the agricultural science teacher, but only a slightly positive perception of the agricultural science program.
4. Gender, age, and ethnicity of counselors, their years of counseling experience, years of classroom teaching experience, whether or not they held vocational counselor certification, whether or not they had taken an agricultural course in high school or college, whether or not they had agriculturally related work experience, and the size of the town/city where their school was located was not related to their perceptions of agriculture, agricultural science programs, and agricultural science teachers. However, counselors with vocational teaching experience had a more positive perception of agriculture as compared to those with no experience. Also, counselors whose generations were least removed from agriculture had the most positive perception of agriculture.
5. Students' perceptions of career counseling and the overall benefit and support of counselors were slightly positive. Their perceptions of the counselors' support of their agricultural science program and the post secondary counseling they received during high school were slightly negative.
6. There was evidence to support the intentionality theory: As the counselors' perception of agriculture decreased or became less positive, the students' perception of the counselors' support of the agricultural science program decreased. This might suggest that the agricultural science students were able to recognize differences in counselors' support of their program based on the counselors' overall perception of agriculture. This same scenario was true when examining the counselors' perception of the agricultural science teacher and the students' perception of the counselors' support of the agricultural science program. This might suggest that the agricultural science students were able to recognize differences in support of their program based on the counselors' perception of their agricultural science teacher.
7. Evidence of intentionality was provided also by the correlation between the students' overall perception of the guidance program and the counselors' perception of the agricultural science teacher. The students' perception of the overall guidance program was positively correlated with the counselors' perception of the agricultural science teacher. This suggests that the students looked favorably on the guidance program if they believed that the counselor(s) had a favorable perception of their agricultural teacher.

RECOMMENDATIONS

The following recommendations for action and additional research are based on the findings and conclusions of the study:

1. More effective communication with counselors is needed by those in agricultural education to improve their knowledge base and their perceptions of agriculture, agricultural science programs, and agricultural science teachers.
2. Because counselors play an important role in the career decisions of students, they should be provided with current and accurate career information about agriculture.
3. The theory of intentionality is that our actions are based on our perceptions/attitudes. Because of the relationship between perceptions of counselors and their practices as perceived by students, counselors should examine their perceptions and attitudes and recognize that those perceptions are reflected in their actions—at least as perceived by their clients.
4. Additional research should be conducted to explore the perceptions of counselors by freshman through junior agricultural science students because this is the period during which many dropouts occur and the need for counselor support is great.
5. Additional research should be conducted to explore why counselors with vocational teaching experience have a more positive perception of agriculture.
6. Additional research is needed to explore the level of understanding among counselors of career opportunities available in agriculture.
7. Additional research is needed to discover how counselors get their perceptions of agriculture, agricultural science programs, and agricultural science teachers.

ERIC

REFERENCES

Allport, F. H. (1955). Theories of perception and the concept of structure. New York: Wiley.

Ballard, E. G. (1983). Principles of interpretation. Athens, OH: Ohio University Press.

Baker, S. B. (1996). School counseling for the twenty-first century (2nd ed.). Englewood Cliffs, NJ: Merrill.

Bottoms, G., Presson, A. & Johnson, M. (1992). Making high schools work through integration of academic and vocational education. Atlanta, GA: Southern Region Education Board.

Davis, J. A. (1971) Elementary survey analysis. Englewood Cliffs, NJ: Prentice Hall.

Dyer, J. E. (1994). Attitudes and perceptions of Illinois secondary guidance counselors toward agriculture and agricultural education. Unpublished doctoral dissertation, University of Illinois at Urbana-Champaign.

English, K. L. (1991). Perceptions of guidance counselors and agricultural educators of agricultural education in Arizona. (Master of science thesis, University of Arizona). UMI Dissertation Services. (University Microfilms No. AAC 1346140)

Feller, R., Daly, J. & Smeltzer, T. (1994). School counselor role in planning and integrating basic skills. Greensboro, NC: ERIC Clearinghouse on Counseling and Student Services. (ED 378462)

Gray, K. C. & Herr, E. L. (1995). Other ways to win. Thousand Oaks CA: Corwin.

Gysbers, N. & Guidance Program Field Writers (1990). Comprehensive guidance programs that work. Ann Arbor, MI: ERIC Counseling and Personnel Services Clearinghouse.

Hull, D. & Parnell, D. (1991). Tech prep associate degree--A win/win experience. Waco, TX: The Center for Occupational Research.

Jackson, D. J. (1997). Intentionality, perceptions, and practices of high school counselors regarding agricultural science programs in Texas. Unpublished doctoral dissertation, Texas A&M University, College Station.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. Education and Psychological Measurements, 30 607 - 610.

Lewis, M. & Kaltreider, L. (1976). Attempts to overcome stereotyping in vocational education. University Park, PA: Institute for Research of Human Resources.

Lotto, L. S. (1985). The unfinished agenda: Report from the National Commission on Secondary Vocational Education. Phi Delta Kappan. 66 568 -573.

Matulis, J. K. (1989). Attitudes, perceptions, and guidance practices of Illinois guidance directors concerning vocational education in secondary schools. (Doctoral dissertation, University of Illinois at Urbana-Champaign). UMI Dissertation Services. (University Microfilms No. AAC8916280).

May, R. (1969). Love and will. New York: Norton.

McGhee, M. B. (1974). Attitudes of superintendents, principals, county vocational directors, and guidance counselors regarding vocational agriculture in the public secondary schools of West Virginia. (Doctoral dissertation, The Ohio State University). UMI Dissertation Services. (University Microfilms No. AAC 7424368).

Miller, L. E. & Smith, K. L. (1983, September/October). Handling nonresponse issues. Journal of Extension, XXI, 45-50.

Millikan, R. (1997). Naturalizing intentionality. A colloquium held February 27, 1997. College Station, TX: Texas A&M University

SPSS Inc. (1993). SPSS for windows base system user's guide release 6.1. Chicago, IL: SPSS Inc.

Parnell, Dale (1985). The neglected majority. Washington, D. C.: The Community College Press.

Sproles, E. K. (1988). Research indicates new approaches for counseling vocational education students. The School Counselor. 36 (1), 18-23.

Thompson, J. C. Jr. (1989). Beliefs and intentions of counselors, parents and students regarding agriculture as a career choice. (Doctoral Dissertation, University of Illinois at Urbana - Champaign). UMI Dissertation Services. (University Microfilms No. AAC 9011051).

Woodward, J. R. & Herren, R. (1994). Perceptions and practices of Georgia guidance counselors regarding agricultural education programs. Proceedings of the 21st Annual National Agricultural Education Research Meeting. XXI, 345-351, Dallas Texas.

W. K. Kellogg Foundation (1985). Cultivating agricultural literacy. G. Douglas , editor. Battle Creek, MI: W. K. Kellogg Foundation.

ERIC

INTENTIONALITY, PERCEPTIONS, AND PRACTICES OF HIGH SCHOOL COUNSELORS REGARDING AGRICULTURE, AGRICULURAL SCIENCE PROGRAMS, AND AGRICULTURAL SCIENCE TEACHERS IN TEXAS

A Critique

James G. Leising
Oklahoma State University

Decreasing enrollment in agricultural education programs has long been a concern for agriculture educators in nearly every state of the US. The authors are to be commended for broaching a subject that educators have often suspected as a possible contributor to the low enrollment in agriculture education programs, namely that of school counselors guiding students away from agriculture education courses. Subtle perceptions, demographic differences, and attitudes held by counselors may well contribute to the problem of low enrollment.

The literature cited by the author's lays a thorough theoretical base for this study on perception and intentionally. It demonstrated the role that intentionality provides in relation to processes and presentation. We are left without doubt as to what are the processes of presentation (agriculture, ag-science programs, and ag-science teachers) and interpretation (counseling practices). Intentionality is said to bridge the two former elements. This description of intentionality was particularly helpful to the reader in understanding this study.

The methods and procedures section did a good job of describing the research design, population and sampling procedures. It appeared that the researchers overestimated the number of respondents and did not obtain the sample of 370 students that was suggested by Krejcie and Morgan (1970) for an estimated population of 10,000. The number of counselors identified through the cluster sampling technique was 96, but only 65 percent responded or a total of 62. From a population of 3200 Texas counselors, is a sample of 62 counselors representative of the population?

Instruments developed for this study were constructed following procedures that insured content validity and reliability. The researchers are to be commended for doing an excellent job. Data collection and data analysis was appropriate.

The findings were organized by objective and the data were presented in tables to assist the reader in understanding the findings. The researches are to be commended for clearly describing the findings noting the important findings.

Conclusions and implications were based on the findings and summarized concisely. This study underscores the need for improved communications between school counselors and secondary agriculture education teachers. Also, it provides excellent base line information for conducting further research regarding the role that counselors play in assisting students to enroll in agriculture education courses and in preparing for post-secondary agricultural study or work beyond high school.

ERIC

NAERC '99

Research Fresh from Florida

Attitudes of Agriculture Teachers, Teacher Educators, and State Staff Toward Recruitment

Lisa Breja
Iowa State Univeristy

James Dyer
University of Missouri

INTRODUCTION/THEORETICAL FRAMEWORK

Agricultural education has been an integral component of the American educational system since its inception. However, it serves only a fraction of the students who could be enrolled in this type of educational program. Although peak enrollments have been impressive, agricultural educators have not been able to sustain a consistent pattern of growth. For example, after several years of steady increase, agricultural enrollments sharply increased until they peaked in 1977 at 697,500 students (National FFA Organization, 1986). However, by the early 1980s, enrollments in some states had declined by as much as 60% (Dyer & Osborne, 1994). Continuing this vacillating pattern, enrollments today are approaching the peak levels of the 1970s (Speer, 1998).

Why do agricultural education enrollments fluctuate so dramatically? The current research base does not answer this question. However, Hoover and Scanlon (1991a) reported that students faced two barriers to enrollment in agricultural education: agriculture's image and the perceived future value of agricultural education. Based on these findings, it appears that enrollments are dependent upon the perceived stability of the agricultural industry. Can extra effort in recruiting by teachers compensate for unfavorable perceptions? Again, current research does not answer the question, but does show that teachers are not using some of the most effective recruiting strategies because they are too time-consuming (Hoover & Scanlon, 1991b).

ERIC
559

While some recruitment tools have been identified, there does not appear to be a successful model for recruitment. Moore, Kirby, and Becton (1997) identified block scheduling as a tool that substantially increased the number of agriculture students. However, they also reported that block scheduling offered little or no impact on either instructional quality or supervised agricultural experience, and a negative impact on FFA membership. Hoover and Scanlon (1991b) identified technology as a recruiting tool. Other studies (Ries & Kahler, 1997; Andreasen, Dyer, & Breja, 1997) have identified parents, agriculture teachers, and other students as being sources of influence to enroll in high school agriculture programs.

According to the National Research Council (1988), agriculture is too important a topic to be taught only to a relatively small percentage of students. As such, agricultural education programs around the nation have experienced several enrollment fluctuations. Anecdotal data suggests those fluctuations are caused by several factors which could be addressed. Specifically, those factors include demographic characteristics (gender, ethnicity, geography, experience in agriculture), a failure on the part of teachers to recruit, a failure on the part of teacher educators to prepare pre-service teachers for the task of recruitment, and a failure on the part of state staff to support teachers in recruitment efforts. Limited research efforts have sought to validate this data, however. This study sought to explore those suppositions by identifying and analyzing the attitudes of agriculture teachers, teacher educators, and state staff toward recruitment.

Expressed attitudes are excellent predictors of intent (Fishbein & Ajzen, 1975). According to Fishbein and Ajzen, intentions to support or participate in an activity can be predicted based upon knowledge, observation, or other information about some issue. This model suggests that a person's intent to become actively involved in a recruitment program, or to support that program, may be predicted by analyzing the participant's beliefs about recruitment. Greenwald (1989) supported this theory, reporting that individuals with positive attitudes toward a subject or situation tend to evaluate them positively. As applied to this study, if teachers, teacher educators, or state staff are interested in, knowledgeable about, have a positive image of, and are involved in recruitment efforts, those individuals will likely support and be actively involved in recruitment efforts in both word and action. Consequently, if beliefs are negative, the individual's interest, knowledge, and level of support will likely also be limited.

PURPOSE

The primary purpose of this study was to determine the perceptions of secondary agricultural education teachers, university agricultural education teacher educators, and state agricultural education staff toward recruitment of students into high school agriculture programs. Specifically, this study addressed the following research questions and tested the corresponding null hypothesis. A null hypothesis was tested since a review of literature failed to support a directional hypothesis.

1. What were the attitudes of agriculture teachers, teacher educators, and state staff toward student recruitment?
2. How did the attitudes of agriculture teachers, teacher educators, and state staff differ toward recruitment?

HO: There is no difference in the attitudes of high school agriculture teachers, teacher educators, or state staff toward recruitment of students for agriculture programs.

3. What were the influences of demographic characteristics (gender, ethnicity, school/community type, region, and years of experience) on attitudes toward student recruitment?

METHODS/PROCEDURES

The project used a descriptive survey design. A stratified sample of high school agricultural education teachers, university teacher educators, and state staff from each state and province offering instruction in agricultural education was selected (N = 402). The Directory of Teacher Educators in Agricultural Education (Graham, 1997) and Directory of National FFA Organization State Advisors and Executive Secretaries (National FFA Organization, 1997) were used as population frames for the selection of university teacher educators and state supervisory staff members, respectively. Teacher educators were randomly selected from state institutions based upon their active involvement in pre-service teacher education (n = 60). A census sample of state staff members (including FFA executive secretaries where separate from state departments) was selected from each state department of education in which agricultural education is taught, including Guam, Puerto Rico, and the Virgin Islands (n = 72). An expert group of high school agriculture teachers were identified by teacher educators and state staff respondents based upon their perceived knowledge of recruitment issues. All members of this group were included in the sample of teachers (n = 270).

The data-gathering instrument for this study was developed by the researchers. Face and content validity were determined using an expert panel of teachers, teacher educators, and state staff not included in the study. Based upon recommendations of the panel, revisions were made to the instrument. The instrument was pilot tested using 25 agriculture teachers, teacher educators, and state staff who were also not participants in the study. Reliability as a measure of internal consistency was calculated using the Spearman-Brown coefficient (r = .69).

The questionnaire contained two sections. The first section was comprised of questions to determine demographic information of the respondents and consisted of open-ended and short-answer questions. The second section contained statements designed to measure the attitudes of the three groups toward recruitment of students into high school agriculture programs. In this section, participants were asked to indicate the degree to which they either agreed or disagreed with each statement. A five-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Uncertain, 4 = Agree, 5 = Strongly Agree) was used for each statement in the second section.

Questionnaire packets were mailed to participants followed by a postcard reminder approximately two weeks later. A second questionnaire packet was mailed to non-respondents approximately four weeks after the first mailing. A total of 270 respondents completed the questionnaire for a response rate of 63.0% of teachers, 63.3% of teacher educators, and 86.1% of state staff. According to Krushat and Molnar (1993), non-response error can effectively be addressed by comparing early and late respondents, since late respondents tend to reply similarly to non-respondents. A comparison of these groups revealed no differences between the two categories of respondents.

Data were analyzed using descriptive statistics, including measures of central tendency and variability. Data were organized and analyzed using the Statistical Package for the Social Sciences (SPSS). Categorical analysis was performed using the following scale: Strongly Disagree (M = 1-1.49), Disagree (M = 1.50-2.49), Uncertain (M = 2.50-3.49), Agree (M = 3.50-4.49), Strongly Agree (M = 4.50-5.0). The null hypothesis was tested at a .05 alpha level. Post hoc analyses were performed using Tukey's b test.

RESULTS AND FINDINGS

Research Question 1

What were the attitudes of agriculture teachers, teacher educators, and state staff toward student recruitment?

Respondents expressed attitudes supportive of the recruitment of students into high school agricultural education programs. However, problems were identified. As indicated in Table 1, respondents strongly agreed with the statement that "all high school agriculture programs should have an active recruitment plan." They agreed that all students can benefit from enrollment in agricultural education, that gender and ethnic diversity are important to the success of agriculture programs, that the future of agricultural education is dependent upon recruitment, and that high quality students should be targeted in recruitment efforts. They further agreed that agriculture teachers are, and should be, accountable for recruitment of students.

Table 1

Areas of Agreement in Attitudes Toward Recruitment of Students into Agricultural Education

Statement	M	SD
All high school agriculture programs should have an active recruitment plan.	4.64	.69
All high school students can benefit from enrollment in agriculture courses.	4.38	.93
Gender diversity is important to the success of agriculture programs.	4.29	.86
The future of agricultural education is dependent upon recruiting students.	4.26	.87
Most high school students should take some course work in agriculture.	4.03	.89
Agriculture teachers are accountable to local school systems for recruitment.	3.90	.98
Students of higher academic quality should be targeted in recruitment programs.	3.76	.95
High school agriculture teachers should be accountable for recruitment of students into their agriculture programs.	3.73	.97
Ethic diversity is important to the success of agriculture programs.	3.62	1.03
Recruitment efforts should be focused on high quality students.	3.53	1.10

Note. Strongly Disagree (M = 1-1.49), Disagree (M = 1.50-2.49), Uncertain (M = 2.50-3.49), Agree (M = 3.50-4.49), Strongly Agree (M = 4.50-5.0).

Respondents expressed attitudes that were described as "Uncertain" on several statements (Table 2). Many of those statements dealt with the image of agricultural education programs by administration, parents, students, and other teachers. In addition, the respondents expressed attitudes in the "Uncertain" range on whether administrators should require teachers to recruit and whether teachers who recruit should be paid higher salaries than those who do not. In addition, respondents were uncertain as to whether they receive adequate support from state staff members in recruitment activities.

Respondents disagreed with the statements that guidance counselors have a positive image of agricultural education ($\underline{M}$ = 2.45, $\underline{SD}$ = .98), that teachers receive adequate training in recruitment techniques from teacher certification programs ($\underline{M}$ = 2.31, $\underline{SD}$ = .98), and that only students pursuing careers in agriculture should enroll in agriculture classes ($\underline{M}$ = 1.15, $\underline{SD}$ = .78). Respondents strongly disagreed that agriculture courses should only be limited to students with farm backgrounds ($\underline{M}$ = 1.22, $\underline{SD}$ = .43).

Table 2

Areas of Uncertainty in Attitudes Toward Recruitment of Students into Agricultural Education

Statement	M	SD
High school administrators value student recruitment by agriculture teachers.	3.46	1.04
Agriculture teachers do an adequate job of recruiting ethnically diverse student populations.	3.43	.99
Most administrators have a positive image of agricultural education.	3.19	1.01
Most parents have a positive image of agricultural education.	3.06	1.02
Recruitment is easier in programs that are more scientific in nature.	3.04	.97
Administrators should require high school agriculture teachers to recruit.	3.04	1.09
Agriculture teachers receive adequate support from state staff members on recruitment activities.	2.96	1.10
Teachers with active recruitment programs should be paid higher salaries.	2.92	1.22
Teachers in subjects other than agriculture have a positive image of agricultural education.	2.92	1.02
Most high school students should take some course work in agriculture.	2.91	1.00
Students of lower academic ability should be targeted in recruitment programs.	2.89	1.05
Agriculture teachers do an adequate job of recruiting ethnically diverse student populations.	2.73	.98

Note. Strongly Disagree ($\underline{M}$ = 1-1.49), Disagree ($\underline{M}$ = 1.50-2.49), Uncertain ($\underline{M}$ = 2.50-3.49), Agree ($\underline{M}$ = 3.50-4.49), Strongly Agree ($\underline{M}$ = 4.50-5.0).

Research Question 2

How did the attitudes of agriculture teachers, teacher educators, and state staff differ toward recruitment?

For the purpose of answering this question, the null hypothesis of no difference in the attitudes of high school agriculture teachers, teacher educators, or state staff toward recruitment of students for agriculture programs was tested at the .05 alpha level. An analysis of variance revealed significant differences between attitudes of teachers, teacher educators, and state staff on several issues. Therefore, the null hypothesis was rejected.

As noted in Table 3, attitudes of high school agriculture teachers differed significantly from state staff and teacher educators on several key issues. At the forefront of those differences were conflicting attitudes toward the image of agricultural education. Teachers' attitudes were significantly different from those of state staff and teacher educators on their beliefs that students, parents, guidance counselors, administrators, and other teachers have a positive image of agricultural education. In each instance, teachers believed the image to be more positive than did state staff or teacher educators. In addition to issues of image, teachers and teacher educators differed in attitudes toward the benefits of agriculture courses for all students, with teachers expressing more positive attitudes.

Table 3

Summary Data and Analysis of Variance of Attitudes of Teachers, Teacher Educators, and State Staff

Variable	N	M	SD	F
Most students have a positive image of agricultural education				19.51*
Teachers	170	3.18[a]	1.05	
Teacher Educators	37	2.32	.67	
State Staff	62	2.52	.74	
Most parents have a positive image of agricultural education				19.84*
Teachers	169	3.34[a]	1.01	
Teacher Educators	37	2.54	.73	
State Staff	62	2.61	.89	
Most counselors have a positive image of agricultural education				16.89*
Teachers	168	2.70[a]	1.04	
Teacher Educators	37	2.05	.62	
State Staff	62	2.00	.75	
Most administrators have a positive image of agricultural education				14.34*
Teachers	169	3.43[a]	1.00	
Teacher Educators	37	2.78	.89	
State Staff	62	2.77	.91	

Table 3 (continued)

Summary Data and Analysis of Variance of Attitudes of Teachers, Teacher Educators, and State Staff

Variable	n	M	SD	F
Most other teachers have a positive image of agricultural education				19.49*
Teachers	168	3.20[a]	1.02	
Teacher Educators	37	2.62	.79	
State Staff	62	2.35	.87	
All high school students can benefit from enrollment in agriculture courses				3.71*
Teachers	170	4.49[a]	.94	
Teacher Educators	38	4.11[b]	.80	
State Staff	62	4.24[ab]	.94	
Ethnic diversity is important to the success of agriculture programs				11.89*
Teachers	169	3.42[a]	1.01	
Teacher Educators	37	4.24[b]	.86	
State Staff	62	3.81[c]	1.01	
Agriculture teachers do an adequate job of recruiting ethnically diverse student populations				24.21*
Teachers	166	3.02[a]	.90	
Teacher Educators	38	2.08	.82	
State Staff	62	2.35	.94	
Gender diversity is important to the success of agriculture programs				2.22
Teachers	170	4.22	.95	
Teacher Educators	38	4.53	.56	
State Staff	62	4.35	.73	
Agriculture teachers do an adequate job of recruiting gender diverse student populations				6.88*
Teachers	168	3.60[a]	.87	
Teacher Educators	38	3.13	1.19	
State Staff	62	3.15	1.08	

Table 3 (continued)

Summary Data and Analysis of Variance of Attitudes of Teachers, Teacher Educators, and State Staff

Variable	n	M	SD	F
Agriculture teachers receive adequate training in recruitment techniques from teacher certification programs				5.72*
Teachers	168	2.31	.95	
Teacher Educators	38	2.74[a]	1.03	
State Staff	62	2.06	.97	

Note. Means with different letter superscripts within categories are significantly different.
* $p < .05$

Diversity was another issue with which the three groups expressed differing attitudes. Each of the groups differed in their belief that ethnic diversity is important to the future of agricultural education. Teacher educators expressed the most positive attitudes toward the need to recruit ethnically diverse populations, followed by state staff. Categorically, teachers were uncertain about this need. Teachers were the only groups that believed they were doing an adequate job of recruiting ethnically diverse populations.

Teachers also agreed that they were doing an adequate job of recruiting gender-diverse populations. Teacher educators and state staff expressed attitudes that were generally uncertain on this issue.

Both teachers and state staff disagreed with the statement that teachers receive adequate training in recruitment techniques from teacher certification programs. Teacher educators were uncertain in their attitudes toward this component of teacher preparation.

Research Question 3

What were the influences of demographic characteristics (gender, ethnicity, school/community type, region, and years of experience) on attitudes toward student recruitment?

The majority of the respondents were male (84.8%, $n = 229$) and Caucasian (93.7%, $n = 253$). Other groups represented were African-American (2.2%, $n = 6$), Asian American (1.1%, $n = 3$), Hispanic (1.1%, $n = 3$), and one person (0.4%) responding as "other." The mean number of years of service was 17.39 with 26.7% ($n = 72$) reporting less than ten years of service, 39.6% ($n = 107$) reporting 11-20 years, 24.4% ($n = 66$) reporting 21-30 years, and 21.5% ($n = 58$) reporting more than 30 years.

Demographic information specific to the type of community in which the secondary agricultural education program was located was also collected. The majority were located in large metropolitan (population > 100,000), medium urban areas (population 10,000 – 99,999), small towns (population < 10,000), or rural areas (8.2%, 26.5%, 48.8%, 16.5%, respectively).

ERIC Full Text Provided by ERIC

Generally, male and female respondents expressed similar attitudes toward recruitment issues. However, some areas of differing attitudes were found (see Table 4).

Table 4

Means and Standard Deviations of Attitudes Toward Recruitment by Gender

Statement	Male	Range*	Female	Range*
All agriculture programs should have an active recruitment plan	4.63 (.69)	Strongly Agree	4.48 (.83)	Agree
Recruitment efforts should be focused on high quality students	3.54 (1.10)	Agree	3.45 (1.03)	Uncertain
Ethnic diversity is important to the success of agriculture programs	3.67 (.97)	Agree	3.42 (1.15)	Uncertain
High school agriculture classes are better suited to male students	1.64 (.68)	Disagree	1.12 (.60)	Strongly Disagree
High school agriculture teachers should be accountable for recruitment of students into their agriculture programs	3.76 (.92)	Agree	3.42 (1.25)	Uncertain
Only students pursuing careers in agriculture should enroll in high school agriculture courses	1.54 (.81)	Disagree	1.36 (.65)	Strongly Disagree

Note. Standard deviations are shown in parentheses. * Strongly Disagree (M = 1-1.49), Disagree (M = 1.50-2.49), Uncertain (M = 2.50-3.49), Agree (M = 3.50-4.49), Strongly Agree (M = 4.50-5.0).

Analyses of variance revealed no significant differences between groups when comparisons were made between respondents of differing ethnic origins, different school/community types, or between respondents based upon years of experience. Differences were identified, however, between respondents' attitudes by region. As noted in Table 5, respondents from Western and Southern regions agreed that agriculture teachers should focus recruitment efforts on high quality students whereas Eastern and Central region teachers were uncertain on this focus. Likewise, Southern respondents were more positive in their beliefs that parents have a positive image of agricultural education and that teachers who recruit should be paid for their efforts. Respondents from the Eastern region strongly disagreed that agriculture classes are better suited to males whereas respondents from the other three regions only disagreed with the statement.

Table 5

Summary Data and Analysis of Variance of Attitudes by Region

Variable	n	M	SD	F
Agriculture teachers should focus recruitment efforts on high quality students				5.92*
Eastern	43	3.02[a]	1.18	
Central	76	3.41[ab]	1.05	
Western	61	3.62[b]	1.19	
Southern	87	3.83[b]	.94	
Most parents have a positive image of agricultural education				4.02*
Eastern	43	2.65[a]	1.02	
Central	76	3.11[b]	1.03	
Western	61	3.00[ab]	1.00	
Southern	87	3.29[b]	.96	
Teachers who recruit should be paid higher salaries				3.09*
Eastern	43	2.58[a]	1.14	
Central	76	2.78[ab]	1.18	
Western	61	2.95[ab]	1.30	
Southern	87	3.19[b]	1.19	
Agriculture classes are better suited to male students				4.12*
Eastern	43	1.33[a]	1.02	
Central	76	1.54[ab]	.96	
Western	61	1.61[ab]	1.03	
Southern	87	1.77[b]	1.02	

Note. Means with different letter superscripts within categories are significantly different.
* $p < .05$

CONCLUSIONS/RECOMMENDATIONS

Support of guidance counselors appears to be a problem in the recruitment process. Each group of respondents believed that guidance counselors do not hold positive images of agricultural education. Dyer and Osborne (1994) noted similar perceptions in an Illinois study, but noted that attitudes were more positive if guidance counselors perceived agricultural education to be scientific. Perhaps agricultural educators should promote the scientific nature of agricultural education to guidance counselors.

Teachers are not prepared to assume the role of recruiter. Each group of respondents identified this weakness in teacher certification programs. New courses addressing recruitment issues should be implemented into teacher education programs. Likewise, inservice workshops should be scheduled to train current teachers in recruitment strategies. In addition, state staff should develop programs through which they can support recruitment efforts.

Teachers, teacher educators, and state staff view the image of agricultural education among stakeholders very differently. Teachers generally believe the image to be positive whereas teacher educators and state staff perceive less positive images. Who is right – the teacher who is logically the closest to the situation or the teacher education and state staff members who are farther removed and perhaps less biased in their perceptions? Or, are teachers accurate in their perceptions and teacher educators and state staff out of touch? Better lines of communication should be developed between the groups, and further research to determine why differences exist is warranted.

A diversity issue exists in agricultural education. Respondents in this study were primarily white (93.7%) and male (84.8%). These numbers do not mirror the make-up of the general population. However, agriculture teachers are uncertain if ethnic diversity is important to the success of agriculture programs, and of whether they do an adequate job of recruiting for diversity. By contrast, teacher educators and state staff agree that ethnic diversity is important, but disagree that teachers are doing an adequate job of recruiting for diversity. By contrast, all either agree or strongly agree that gender diversity is important to the success of agricultural education. However, only the teacher group believed they were doing an adequate job in this area. If gender and ethnic diversity are goals of agricultural education programs, additional training and assistance will likely have to be provided by both teacher education programs and state staff if those goals are to be attained.

Male teachers, teacher educators, and state staff members expressed attitudes generally more positive toward recruitment than did female respondents. However, female respondents expressed more positive attitudes toward recruiting for diversity than did their male counterparts. Teacher educators and state staff should address these differences in courses and/or inservice programs.

Respondents from the Eastern region expressed attitudes generally less favorable toward recruitment and the image of agricultural education than did respondents from other regions of the U.S. Since program numbers in this region have been on a steady decline for the past decade (Camp, et al., 1996), are these attitudes a result of the diminishing numbers of agricultural education programs in this region? Or, is the attrition occurring as a result of the attitudes of the stakeholders? Further research is recommended to identify the influences on respondents' attitudes from all regions and to develop strategies to address these attitudes.

REFERENCES

Andreasen, R. J., Breja, L. M., & Dyer, J. E. (1997, December). Attitudes of Iowa State University College of Agriculture freshmen toward agriculture. Paper presented at the National Agricultural Education Research Conference, Las Vegas, NV.

Camp, W. G., Egan, G., Garton, B., Dyer, J., Flowers, J., Stewart, M., Williams, S., Scofield, G., Foster, B. (1996, December). Teacher Recruitment. Workshop conducted at the American Association for Agricultural Education Meeting, Cincinnati, OH.

Dyer, J. E., & Osborne, E. W. (1994, February). The influence of science-based agriculture courses on the attitudes of Illinois guidance counselors. Paper presented at the Central Region Agricultural Education Research Conference, St. Louis, MO.

Fishbein, M. and Ajzen, I. (1975). Beliefs, Attitudes, Intentions, and Behaviors. Reading, MA: Addison-Wesley Publishing Co.

Graham, D. L. (Ed.). (1997). Directory of Teacher Educators in Agricultural Education. Washington, DC: U.S. Department of Education

Greenwald, A. G. (1989). Attitude structure and function. Hillsdale, NJ: Erlbaum Associates.

Hoover, T. S., & Scanlon, D. C. (1991a). Enrollment issues in agricultural education programs and FFA membership. Journal of Agricultural Education, 32(4), 2-10.

Hoover, T. S., & Scanlon, D. C. (1991b). Recruitment practices—a national survey of agricultural educators. Journal of Agricultural Education, 32(3), 29-34.

Krushat, W. M., & Molnar, J. I. (1993). The effect of nonrespondents on a self-administered mail survey. Evaluation-Practice, 14(1), 25-32.

Moore, G., Kirby, B., & Becton, L. K. (1997). Block scheduling's impact on instruction, FFA, and SAE in agricultural education. Journal of Agricultural Education, 38(4), 1-10.

National FFA Organization. (1997). Directory of National FFA Organization State Advisors and Executive Secretaries. Washington, DC: U.S. Department of Education.

National FFA Organization. (1986). Participation in selected FFA activities. Alexandria, VA: Author.

National Research Council (1988). Understanding Agriculture: New Directions for Education. Washington, DC: National Academy Press.

Reis, R., & Kahler, A. A. (1997). Factors influencing enrollment in agricultural education programs as expressed by Iowa secondary agricultural education students. Journal of Agricultural Education, 38(2), 38-48.

Speer, T. L. (1998, March). Agriculture education: A bumper crop of students. Techniques: Making Education & Career Connections, 73, 30-32.

ATTITUDES OF AGRICULTURE TEACHERS, TEACHER EDUCATORS AND STATE STAFF TOWARD RECRUITMENT

A Critique

James G. Leising
Oklahoma State University

This study sought to explore the attitudes of agriculture teachers, teacher educators and state staff toward recruitment of secondary agriculture education students. The researchers did a good job of developing a theoretical framework from the literature that detailed what is known about recruitment of students into secondary agriculture education programs. The work by Fishbein and Ajzen was particularly helpful in building a rationale for conducting a perception study of teachers, teacher educators and state staff toward recruitment. However, I would like to know why the researchers decided to do a perception study of attitudes toward recruitment rather then conducting a study of actual agriculture teacher recruitment practices in programs that have been successful? It appeared to me that if we really want to know what works in recruitment, it would be best to study actual practice. Also, the relationship between secondary agriculture education enrollment fluctuation and student recruitment was not clearly established in the literature cited.

The purpose and research questions addressed by the researchers were clear and easy to understand. Methods and procedures were well described and the data gathered using appropriate procedures. The definition of an "expert secondary agriculture teacher" would be helpful to the reader in understanding that respondent group. Great care was taken to insure content validity and reliability of the instruments developed for use in data gathering. Appropriate data analysis was conducted and described.

Findings of this study were organized by research question and were clearly stated. I compliment the authors for doing a very thorough job of summarizing the findings. Conclusions were appropriate and supported by the findings.

This study provided excellent base line data regarding perceptions of agricultural teachers, teacher educators and state staff toward recruitment of secondary students into agriculture education programs. Further research of actual recruitment practices conducted by agricultural teachers from highly successful programs may be helpful in the development of a recruitment model that could be used to enhance preservice teacher education.

ERIC Full Text Provided by ERIC

NAERC '99
Research Fresh from Florida

The Learning Styles of Entering Freshmen in a College of Agriculture: A Longitudinal Study

Bryan Garton
University of Missouri

Robin Thompson
University of Missouri

INTRODUCTION

Since the 1970s, an increasing number of educational researchers have studied learning style theories in an effort to strengthen and improve educational strategies and methods (Witkin, Moore, Goodenough, & Cox, 1977; Dunn & Dunn, 1979; Doebler & Eike, 1979; Schroeder, 1993). Claxton and Murrell (1987) suggested that the study of learning styles could help improve the educational process in higher education. Schroeder (1993) stated that possessing knowledge of learning styles could improve curricula and the learning-teaching process in higher education. Schroeder also noted that students are coming to institutions of higher learning with a greater amount of diversity in their learning needs than ever before. Similarly, Anderson and Adams (1992) indicated that additional research was needed to meet the challenge of this increasing diversity.

In addition to targeting teaching methods and strategies, learning styles have been found to influence academic disciplinary action (Cano, 1999), student retention (Cano & Porter, 1997), how students interacted with teachers, and students' academic choices (Witkin, 1973; Witkin, et al., 1977; Gregoric, 1979; Garger & Guild, 1984; Schroeder, 1993). It has also been suggested that learning styles may be used in concert with university admission criteria to predict student achievement and retention (Cano & Porter, 1997; Cano; 1999).

Witkin (1973) defined learning style as a student's preference for particular teaching strategies and learning environments. Gregorc (1979) described a person's learning style as the distinct behaviors which serve as indicators of how a person learns and adapts to his/her learning environment. Others (Dunn & Dunn, 1979; Garger & Guild, 1984) have defined leaning style as the educational conditions under which an individual is most likely to learn.

ERIC

One of the most persistent theories on learning style that emerged from the 1970s has been the field-dependence/independence dimension (Kogan,1971; Guild & Garger, 1985). The theoretical model, as defined by Witkin (Witkin, et al., 1977), categorizes the cognitive processes of learners as primarily field-dependent or field-independent. To identify the preferred learning style of students, Witkin (1971) developed and normed an instrument entitled the *Group Embedded Figures Test (GEFT)*. For more than 25 years, educational researchers have used GEFT scores when reporting the field-dependence/ independence preferences of learners.

Individuals preferring a field-dependent learning style are likely to perceive situations globally and have a more difficult time solving problems; these learners tend to be extrinsically motivated social learners, and achieve better when organization and structure is provided by a teacher (Witkin, et al., 1977). In contrast, individuals who prefer a field-independent learning style tend to view concepts analytically, therefore finding it easier to solve problems. Field-independent learners prefer to provide their own structure and organization for learning, are intrinsically motivated, and are more likely to favor learning activities that require individual effort (Witkin, et al., 1977).

Research specific to the field-dependence/independence preferences of agriculture students has been conducted at several land-grant institutions. Torres and Cano (1994) and Cano (1999) found that a majority of agriculture students preferred a field-independent learning style and that the learning style of these students tended to be associated with specific academic degree programs. Other researchers have suggested that agriculture students' academic aptitude and performance, including ACT scores and grade point average, were related to learning styles (Anderson & Adams, 1992; Torres & Cano, 1994; Cano & Porter, 1997; Cano, 1999). Cano (1999) suggested that field-dependent agriculture students were more likely to receive academic disciplinary action, change majors, and leave the university.

Recent studies identified inconsistencies with previous research on agriculture students' preferred learning styles (Cano, 1999). Researchers found that agriculture students' mean GEFT score at one land-grant institution was nearly two points above the established national GEFT norm of 11.4, and that a higher percentage of females than males preferred a field-independent learning style (Garton, Dauve & Thompson, 1999). Cano (1999) found inconsistencies in the learning styles of agriculture students by academic major when compared to data from previous studies.

The recent findings suggest the possibility that more agriculture students than ever before may have a field-independent tendency and that field-dependent learners have less academic success in college. However, based upon the lack of a longitudinal study and the inconsistencies found by Cano (1999) and Garton, Dauve and Thompson (1999), the findings cannot be considered conclusive. Cano (1999) called for further investigation to "discover the reasons leading to the inconsistency"and to "determine the 'real' reasons the students changed majors or left the university."

To help clarify the inconsistencies and identify if trends among agriculture students are emerging, a longitudinal study is deemed appropriate. If the findings of the previous studies are found in a longitudinal study, then further exploration into the reason(s) for the inconsistent findings might be warranted. Further, if trends are emerging, it will be imperative for agriculture instructors to keep abreast of the research in order to target educational strategies that will best meet the academic needs of both field-dependent and field-independent learners.

PURPOSE/OBJECTIVES

The purpose of this longitudinal study was to examine the preferred learning styles of freshmen entering a college of agriculture in the of Fall 1997 and 1998. The research objectives were:

1. Describe the preferred learning style by gender and academic major.
2. Describe the relationships between learning styles, university admission variables, academic performance, and academic disciplinary action.

METHODS

The population for this descriptive study was entering freshmen in the College of Agriculture, Food and Natural Resources at the University of Missouri in the Fall of 1997 and Fall 1998 (N=664). An accessible sample consisted of students enrolled in a learning and development course (n=442).

The Group Embedded Figures Test (GEFT) (Witkin, et al., 1971) was administered to assess the preferred learning style of students as field-dependent or field-independent. The possible range of scores on the GEFT was 0-18. The established normed mean on the GEFT is 11.4 (Witkin, et al., 1971). Individuals scoring 11 or less were considered to prefer a field-dependent learning style, while individuals scoring 12 or greater were considered to prefer a field-independent learning style.

The GEFT is a standardized instrument with validity and reliability established by the instrument's developers (Witkin, et al., 1971). The validity of the GEFT was established by determining its relationship with the "parent" test, the Embedded Figures Test (EFT), as well as the Rod and Frame Test (RFT), and the Body Adjustment Test (BAT) (Witkin et al, 1971). The GEFT is a timed test, therefore internal consistency was measured by treating each section as split-halves (Spearman-Brown reliability coefficient of .82) (Witkin et al, 1971).

The GEFT was administered to Fall 1997 and Fall 1998 entering freshmen enrolled in a college learning and development course during the second week of the semester. Descriptive statistics were calculated on GEFT scores and gender, college academic major, university admission variables, and academic disciplinary action. Pearson product moment correlation coefficients were calculated between GEFT scores and variables with interval data. A Point-biserial correlation coefficient was calculated between the GEFT scores and academic disciplinary action. Correlation coefficients were interpreted utilizing Davis' (1971) descriptors.

RESULTS/FINDINGS

The first objective sought to describe the preferred learning style, by gender and academic major, of entering freshmen in the College of Agriculture, Food and Natural Resources. The combined data on the learning styles of Fall 1997 and Fall 1998 entering freshmen revealed that 69% (303) preferred a field-independent learning style and 31% (139) of the students preferred a field-dependent learning style (Table 1). The mean GEFT score for Fall 1997 entering freshmen was 13.3 (SD 3.9) and the mean score for Fall 1998 entering freshmen was 12.5 (SD 4.7).

Table 1
Preferred Learning Style by Gender (n=442)

	1997						1998					
	Field-Dependent		Field-Independent		GEFT		Field-Dependent		Field-Independent		GEFT	
	n	%	n	%	M	SD	n	%	n	%	M	SD
Males	36	29	87	71	13.2	3.9	42	36	75	64	12.4	4.7
Females	30	25	92	75	13.3	3.8	31	39	49	61	12.6	4.7
Total	66	27	179	73	13.3	3.9	73	37	124	63	12.5	4.7

A gender analysis revealed that 68% (162) of male and 70% (141) of the female freshmen students preferred a field-independent learning style. At the other end of the learning style continuum, 32% (78) of the males and 30% (61) of the females preferred a field-dependent learning style. The mean GEFT score for Fall 1997 males was 13.2 (SD 3.9) and females was 13.3 (SD 3.8); the mean score for Fall 1998 males was 12.4 (SD 4.7) and females was 12.6 (SD 4.7).

An analysis of the learning styles of Fall 1997 and Fall 1998 entering freshmen by academic major indicated that a majority of the academic majors leaned toward field-independence (Table 2). In the Social Sciences (Agricultural Economics, Agricultural Education, and Agricultural Journalism), 73% (n=45) of the students in 1997 and 68% (n=42) of the students in 1998 were classified as preferring a field-independent learning style. In the Physical and Biological Sciences (Agricultural Systems Management, Animal Science, Biochemistry, Food Science, Forestry, and Plant Science), 77% (n=105) of the students in 1997 and 63% (n=51) of the students in 1998 were recorded as field-independent. General Agriculture students also showed a preference for field-independence in both 1997 and 1998. Results were mixed for undecided majors and those falling into the "Other" category (Fisheries and Wildlife, Hotel/Restaurant Management, and Parks and Recreation majors).

Table 2
Preferred Learning Style by Academic Major (n=442)

	1997				1998			
	Field-Dependent		Field-Independent		Field-Dependent		Field-Independent	
	n	%	n	%	n	%	n	%
Social Sciences:								
Ag Economics	9	27	24	73	10	40	15	60
Ag Education	4	20	16	80	7	26	20	74
Ag Journalism	4	44	5	56	3	30	7	70
TOTAL	17	27	45	73	20	32	42	68
Physical/Biological Sciences:								
Ag Systems Mgt	3	20	12	80	1	17	5	83
Animal Science	24	24	76	76	19	46	22	54
Biochemistry	3	19	13	81	8	28	21	72
Food Science	0	0	1	100	2	67	1	33
Forestry & Plant Science	2	40	3	60	0	0	2	100
TOTAL	32	23	105	77	30	37	51	63
General Agriculture	6	40	9	60	0	0	10	100
Other[a]	2	67	1	33	2	29	5	71
Undecided	9	35	17	65	20	57	15	43

[a] Atmospheric Science, Hotel/Restaurant Management, Parks and Recreation, and Fisheries and Wildlife

The second research objective sought to describe the relationship between students' learning style, university admissions variables, freshmen year academic performance, and academic disciplinary action. A low positive relationship existed between GEFT scores and the university admissions variables of high school class rank (percentile) and high school core grade point average (Table 3). GEFT scores had a moderate relationship with ACT composite scores in 1997 (r=.36) and 1998 (r=.45). A low positive relationship was also found between GEFT scores and freshmen year grade point average in both 1997 and 1998.

577

Table 3
Relationship Between Learning Style (GEFT), Admissions Variables, Academic Performance, and Disciplinary Action (n=442)

	1997			1998		
	M	SD	r	M	SD	r
H.S. class rank (percentile)[a]	72.62	18.41	.24*	73.73	19.72	.23*
H.S. core GPA[a]	3.38	.51	.22*	3.27	.54	.25*
ACT composite[a]	24.77	4.04	.36*	23.76	3.87	.45*
Freshmen year GPA[a]	2.87	.69	.21*	2.62	.75	.15*
Academic disciplinary action[b]			-.02			.01

*p<.05
[a] Pearson product moment coefficient.
[b] Point-biserial coefficient. Academic disciplinary coding: 0 = no scholastic probation; 1 = scholastic probation; 2 = ineligible to enroll next semester; 3 = not enrolled semester of study.

In 1997, 18% (12) of the field-dependent and 16% (29) of the field-independent learners received academic disciplinary action. In 1998, 29% (21) of the field-dependent and 30% (37) of the field-independent learners received academic disciplinary action. There was no relationship between GEFT scores and academic disciplinary action in 1997 or 1998.

CONCLUSIONS/IMPLICATIONS/RECOMMENDATIONS

A majority of the freshmen entering the College of Agriculture, Food and Natural Resources preferred a field-independent learning style. This finding was consistent with previous research which found that a majority of college agriculture students preferred a field-independent learning style (Torres & Cano, 1994; Cano & Porter, 1997, Cano, 1999). However, the students' mean GEFT score was 13.3 in 1997 and 12.5 in 1998, which were both above the established national norm of 11.4 (Witkin, et al., 1977). While both scores appeared high, the 1998 mean GEFT score of 12.5 was comparable to the mean GEFT score of college of agriculture students from previous studies (Torres & Cano, 1994; Cano & Porter, 1997).

Both male and female college of agriculture students preferred a field-independent learning style. A slightly higher percentage of females than males preferred a field-independent learning style. This finding is not consistent with previous research. Torres and Cano (1994) reported that a majority of female agriculture students leaned toward a field-dependent learning style where in the current study only 30% of the females preferred a field-dependent learning style. Garger & Guild (1984), Witkin, et al., (1977), and Claxton & Murrell (1987) also found persistent gender differences, with females leaning toward a field-dependent learning style. Further study is needed to determine why a larger percentage of females than males in this college of agriculture were attracted to field-independence. Have researchers at other colleges of agriculture noted this trend?

In addition to a larger percentage of female college students preferring a field-independent learning style, the mean GEFT scores for females was 13.3 and 12.6, somewhat higher than the established GEFT norm for females at 10.8. It is not clear what contributed to the higher scores for females or if higher GEFT scores will persist. Why were the females students in this study more field-independent than their female peers across the country? Is the college of

agriculture in the current study more attractive to female field-independent learners than other institutions? Longitudinal study is needed -- at several institutions -- to determine if a trend among female agriculture students is emerging.

In previous research (Torres & Cano, 1994; Cano & Porter, 1997; Cano, 1999), inconsistent findings were reported in the learning style preferences of students majoring in Agricultural Economics, Agricultural Journalism/Communication, Agricultural Systems Management, and Plant Science. Cano (1999) concluded that students "attracted to the 'social' sciences were field-dependent." In the current study, a majority of the GEFT scores indicated a preference for field-independence, including all of the academic majors in the social sciences category. Consistent with previous research, however, students in Agricultural Education and Animal Science were classified as field-independent. Do differences in academic majors exist at other universities? Further investigation is encouraged to determine if learning style preferences by academic major vary across geographic regions of the United States.

In 1997 and 1998, students' ACT composite score, high school rank (percentile), and high school core GPA had a low positive relationship with GEFT scores. This confirmed the findings of previous research (Witkin, et al., 1977; Frank, 1986; Cano & Porter, 1997) that showed learning style was positively related to university admissions variables. However, it is still not known why these relationships exist.

While both Freshmen year GPA and high school core GPA showed a low positive relationship with GEFT scores, it is not known why students' high school core GPA showed a slightly higher relationship with GEFT scores than their Freshmen year GPA. Consequently, does this imply that colleges/universities meet students' diverse academic needs more closely than secondary schools? What specific educational strategies would better meet the academic needs of agriculture students? Further study may help to answer these questions. It is also suggested that researchers conduct longitudinal study to explore if GEFT scores continue to correlate with cumulative grade point averages throughout students' college careers.

There was no relationship between GEFT scores and academic disciplinary action, a fairly consistent finding with Cano's (1999) research. However, even with the current sample of 442 students, it remains unclear whether field-dependent or field-independent students are more likely to receive academic disciplinary action. Do field-dependent students have the same graduation rate as field-independent students? Longitudinal study with agriculture students would help to expand the research base on academic disciplinary action, retention, and graduation rates by the field-dependent/independent dimension.

Once the research is consistently replicated, workshops on learning styles should be provided for agriculture instructors so that they may become more aware of the learning differences found among students. During these workshops faculty should also analyze their own teaching strategies and make modifications to enhance the teaching and learning environment in the college. Dunn and Dunn (1979) found that teachers teach the way they learn. This underscores the need for each instructor to have an understanding of how his/her learning style can influence the teaching-learning process.

Each student should also have an understanding of how his/her learning style may potentially impact academic success. Students should be offered educational strategies on how to adapt their learning strategies and study habits to meet various learning situations and specifics on how to "cope" with instructors who demonstrate learning style preferences different from their own.

ERIC

REFERENCES

Anderson, J. A., & Adams, M. (1992). Acknowledging the learning styles of diverse student populations: Implications for instructional design. In L. L. Border & N. Van Note Chism (Eds.), New Directions for Teaching and Learning, (pp. 19-33). San Francisco: Jossey-Bass Publishers, Inc.

Cano, J. (1999). The relationship between learning style, academic major, and academic performance of college students. Journal of Agricultural Education, 40(1),30-37.

Cano, J., & Porter, T. L. (1997). The relationship between learning styles, academic major, and academic performance of college of agriculture students. Proceedings of the 24th Annual National Agricultural Education Research Meeting, (pp. 373-380). Las Vegas: NV.

Chickering, A. W. (1976). Undergraduate academic experience. Journal of Educational Psychology, 63(2), 134-143.

Claxton, C. S., & Murrell, P. H. (1987). Learning styles: Implications for improving education practices. (ASHE-ERIC Higher Education Report No. 4). Washington, DC: Association for the Study of Higher Education.

Doebler, L. K., & Eicke, F. J. (1979). Effects of teacher awareness of the educational implications of field-dependent/field-independent cognitive style on selected classroom variables. Journal of Educational Psychology, 71(2): 226-232.

Dunn, R. S., & Dunn, K. J. (1979). Learning styles/teaching styles: Should they...can they...be matched? Educational Leadership, 36, 238-244.

Frank, B. M. (1986). Cognitive styles and teacher education: Field dependence and areas of specialization among teacher education majors. Journal of Educational Research, 80(1): 19-22.

Garger, S., & Guild, P. B. (1984, February). Learning styles: The crucial differences. Curriculum Review, 9-12.

Garton, B. L., Dauve, J. L. & Thompson, R. W. (1999). Predictors of student achievement in an introductory agricultural economics course. Proceedings from the 53rd Annual Central Region Research Conference in Agricultural Education (pp.102-108) St. Louis, MO.

Garton, B. L., Thompson, G. W., & Cano, J. (1997). Agriculture teachers and students: In concert or conflict? Journal of Agricultural Education, 38 (1), 38-45.

Gay, L. R., (1996). Educational research competencies for analysts and application (Fifth Edition). Englewood Cliffs, NJ: Prentice-Hall, Inc.

Gregorc, A. F. (1979). Learning/teaching styles: Potent forces behind them. Educational Leadership, 36, 234-236.

Guild, P. B., & Garger, S. (1985). Marching to different drummers. Alexandria, VA: Association for Supervision and Curriculum Development.

Kogan, N. (1971). Educational implications of cognitive styles. In G. S. Lesser (Ed.), Psychology and Educational Practice. Glenview, IL: Scott and Foresman.

Schroeder, C. C. (1993, Sept-Oct). New students - new learning styles. Change. September/ October 1993, 21-26.

Torres, R. M., & Cano, J. (1994). Learning styles of students in a college of agriculture. Journal of Agricultural Education, 35(4), 61-66.

Witkin, H. A. (1973). The role of cognitive style in academic performance and in teacher-student relations. Paper presented at a symposium sponsored by the GRE Board, Montreal, Canada. Princeton, NJ: Educational Testing Service. (ERIC Document Reproduction Service No. ED 083 248)

Witkin, H. A., Moore, C. A., Goodenough, D. R. & Cox, P. W. (1977). Field-dependent and field-independent cognitive styles and their independent cognitive styles and their educational implications. Review of Educational Research, 47(1), 1-64.

Witkin, H. A., Oltman, P. K., Raskin, E., & Karp, S. A. (1971). Group Embedded Figures Test Manual. Palo Alto, CA: Consulting Psychologist Press.

THE LEARNING STYLES OF ENTERING FRESHMEN IN A COLLEGE OF AGRICULTURE: A LONGITUDINAL STUDY

A Critique

Carol A. Conroy
Cornell University

The authors of this study investigated the learning styles of entering freshman in the College of Agriculture, Food and Natural Resources at the University of Missouri. Their descriptive study was intended to clarify inconsistencies revealed through some of the previously conducted research in regards to the preferred learning styles of agriculture students at other major universities, and the relationships of learning styles to various factors such as admissions variables, academic performance, and disciplinary actions. Differences between males and females were also investigated, an important factor given the ever-increasing number of females enrolling in colleges of agriculture across the country. The authors are to be commended for conducting this study for the purpose of identifying if patterns may be emerging related to female enrollees, and for considering the implications of these patterns for agriculture instructors.

The authors provided a well-structured literature review related to learning styles that led into a clear delineation of the importance of this study. I would have liked to have seen a more in-depth and detailed discussion of learning styles, in general, to include other ways in which they are measured and, particularly, the importance of learning styles research to improvement in college teaching. The authors spent time addressing basic information about the Group Embedded Figures Test (GEFT) that I would have included in the section on methodologies as a rationale for its selection. This would have permitted a more comprehensive presentation of a theoretical framework for the study.

The purpose and objectives for the study were clearly identified, with validity and reliability information provided for the GEFT as well as the appropriate citations. The authors utilized the correct data analysis and reporting procedures for their population data although I would like to see less duplication of information presented in both the narrative and tables and more substantive discussion of the results and their implications. The authors may also want to consult Scott Menard's (1991) work on longitudinal studies to either determine if this study would be better characterized as a cross sectional study or to provide some justification for consideration of it as longitudinal. The authors do not mention whether they plan to do any follow-up work with the 222 (33% of total) students in their college who were not enrolled in the learning and development course that they characterized as the accessible population. I would argue that this was not necessarily the accessible population, but a subpopulation of the total enrollment and there should be more care given to generalizing the findings to the entire group of freshmen who matriculated over the two-year period.

Some general questions about learning styles research can be posed to drive future studies:

- How or what are we supposed to do with the results of learning styles research? In other words, what do we do if learning style is related to choice of major? Isn't it predictable, i.e., engineers and economists are usually field independent? Is this a surprise?

582

ERIC

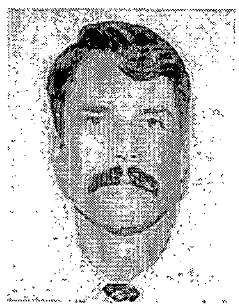
- Given the historically low correlations found with learning styles research, is there perhaps a measurement issue with grouping measurements designed as an individual diagnostic tool, and lumping them into a common pool? What is an average independent learner, for instance?
- Does the collapse of a continuous score into two nominal categories, such as is done in the GEFT, reduce the amount of variability within the dependent and independent learners?

I really enjoyed reading the Conclusions/Recommendations/Implications of this paper and believe it provides a model for how this section should be written in that it clearly ties the results of the study to the theoretical framework. In addition, the authors bring up several substantive questions that should be of interest to learning styles researchers, and pose these as recommendations for future research on the topic. The authors are to be commended for providing us with information that should be of interest to faculty in colleges of agriculture and, especially, those of us in agricultural education that work with our colleagues to improve the teaching and learning process at the college level.

Menard, S. (1991). Longitudinal Research. Newbury Park: Sage, Series on Quantitative Applications in the Social Sciences, #76.

NAERC '99
Fresh
Florida

The Relationship Between Thinking Styles, Field Dependence and Independence, and Student Performance on Selected Thinking Exercises in an Undergraduate Agriculture Course



Julie Sexton
Mississippi State University

Matt Raven
Mississippi State University

INTRODUCTION

Sternberg (1990) asserts that thinking and learning styles are partly socialized constructs, similar to the way that a person's intelligence can be a product of their environment. Some of the variables that may influence a person's style are culture, gender, age and parenting style. Flexibility among a student's array of styles may be the key to their academic success. Educators like to use the analogy of a set of tools in a toolbox to explain many topics. In the case of learning and thinking styles, the student's toolbox is probably full of tools but they may still consistently elect to use the hammer.

The realization that with any classroom of students there is an array of thinking and learning styles leads to many questions. Can educators predict which students in their classrooms will be more adept at certain tasks? Would it be possible to make this "leap of faith" simply by administering a standardized instrument? Do educators unintentionally design course exercises in

such a way that certain students are doomed to failure while ensuring other students' success? What is the point of attempting to categorize students with certain thinking and learning styles? This research project was designed to help fill a void in the literature as it relates to these questions and more.

THEORETICAL FRAMEWORK

Field Independence and Field Dependence

Witkin and Goodenough (1981) defined field dependence-independence as an indication of the degree to which an individual uses external or internal cues. Witkin (1976) concluded "field-independent students favor domains in which analytical skills are called for, such as physical and biological science, mathematics, engineering and technical activities" (p. 50). The Group Embedded Figures Test (GEFT) is the common measure of field dependence-independence (Tinajero & Paramo, 1997). The GEFT is designed to determine the extent to which students are able to overcome the effect of background distractions while staying focused on the issue at hand. The GEFT score is based on the student's success in locating 18 simple figures embedded in complex figures (Witkin, Oltman, Raskin & Karp, 1971).

The national average mean on the GEFT is 11.4 (Witkin et al., 1971). Individuals scoring below the national mean are considered field-dependent. These individuals tend to have highly developed social skills, favor a spectator approach to learning, and need structured learning environments. Individuals scoring above the national mean are considered field-independent. Field-independent individuals are more accomplished at logical reasoning, may have inferior social skills, and can provide their own structure to facilitate learning.

Many studies have documented the differences in learning styles that exist in the formal education setting. Cacino and Cicchelli (1988) proposed that learning achievement for field-independent students would be highest when they were matched with learning activities that offered minimal guidance and encouraged discovery methods. Additionally, they ascertained that learning achievement for field-dependent students would be highest when the learner was offered more guidance, including instructional techniques like teacher-centered presentations.

Bracey (1995) concluded that there is a significant interaction between assessment format and learning style. He reported that field-independent students scored higher on performance/application tests and lower on multiple-choice tests. The opposite was true for field-dependent students. Fergusson (1992) reported that GEFT scores were positively correlated with grade point averages of college art students.

Thinking Styles

According to Sternberg (1997), a style is a preferred way of thinking and using the abilities one has. People do not have *a style*, but rather a profile of styles. The flexible use of the mind accounts for the variety of thinking styles (Sternberg, 1993). This style is not always complimentary to the style valued by educational institutions of learning. This valued style is one that easily accommodates memorization and other test-taking strategies. Sternberg ascertains that our modern educational society constantly confuses these thinking styles as being directly related to the person's ability. Additionally, Sternberg posited that often children are viewed as being

stupid simply because they do not match the style of the educator or they suffer from anxiety when taking intelligence-type tests.

Sternberg (1997) proposed that we all have a mental self-government that represents our unique ways of organizing and thinking through information. The basic premise is that people, like societies, have to govern themselves (Grigorenko & Sternberg, 1997). Sternberg drew a number of parallels between the individual and the society, including a need to govern ourselves and maintain a sense of control, a need to set and realize priorities, a need to properly allocate our resources and a need to be responsive to changes in our environment. Illustrated in Table 1 is the theory of mental self-government's functions, levels and scopes utilized in this research.

Table 1.
Sternberg's Theory of Mental Self-Government

Styles	Characteristics
Functions	**Type** of tasks most enjoyed
Executive	▪ like to follow and apply rules ▪ prefer prefabricated problems ▪ enjoy solving mathematical-type problems ▪ Example occupation = lawyer, police officer
Legislative	▪ creative ▪ enjoy creating their own rules ▪ enjoy making up their own problems ▪ enjoy designing innovative projects and inventing things ▪ Example occupation = artist, investment banker
Judicial	▪ enjoy evaluating rules/procedures and giving opinions ▪ enjoy critiquing and analyzing others' ideas ▪ Example occupation = judge, systems analyst
Levels	*How* people go about doing tasks
Global	▪ prefer to work with large and abstract issues ▪ despise details of tasks ▪ often unable to see the trees that make up the forest
Local	▪ prefer concrete problems ▪ enjoy working with the details of tasks ▪ tend to be down-to-earth and pragmatic ▪ often unable to see the forest because they focus on the trees
Scopes	*How* people go about doing tasks
Internal	▪ turn inward to solve problems ▪ can be more introverted ▪ less socially aware ▪ prefer applying their intelligence in isolation and not with other people ▪ similar to characteristics of Witkin's field-independence
External	▪ extroverted and outgoing ▪ enjoy working with people ▪ more aware of other people's emotions and ideas ▪ similar to characteristics of Witkin's field-dependence

Source: Sternberg, R. J. (1997). Thinking styles. New York, NY: Cambridge University Press.

BEST COPY AVAILABLE

Sternberg asserted that "one becomes suspicious of the relation between a style and an ability when one of the two complementary styles always seems to be better," (1997, p. 136). In the case of Witkin's measures of field-dependence and field-independence, field-independence always seems to be the preferred style. However, twenty studies have found field-independence to be consistently correlated with both verbal and performance aspects of intelligence, and virtually inseparable from spatial ability (Sternberg, 1997, 136). A review of the literature of both the Sternberg-Wagner Thinking Styles Inventory (SWTSI) and the GEFT would suggest that these two instruments would produce similar cognitive classifications through different means. The SWTSI uses a self-reported instrument, while the GEFT is more ability based.

Riding and Staley (1998) posited that how students perceive themselves as learners might influence their motivation, their interests and their academic performance. By using learning strategies, they found that students could overcome cognitive style weaknesses.

PURPOSE AND QUESTIONS

The primary purpose of this research was to determine the relationship between students' thinking styles, field-dependence and independence and their degree of success in completing course thinking exercises. The following questions guided the researchers:

(1) How can the sample be described in terms of Sternberg's thinking styles and the Group Embedded Figures Test?
(2) What is the relationship between students' scores on the SWTSI instrument and performance on thinking exercises that relate to those thinking styles?
(3) What is the relationship between students' scores on the GEFT instrument and performance on the course thinking exercises?
(4) What is the relationship between students' scores on the GEFT and SWTSI instrument?

METHODOLOGY

Research Design

This research design was both descriptive and correlational in nature. Measurement and non-response error were primary internal validity concerns and were addressed by a consistent attention to detail, thorough recording and rigorous follow-up measures.

Sampling

The sample for the study consisted of 27 male and 3 female agricultural students at Mississippi State University. These students enrolled in AIS 2613, Introduction to Information and Decision Science in Agriculture, during the Fall 1998 semester. The class is a required course for a number of majors in the College of Agriculture and Life Sciences, especially Agricultural and Extension Education (AEE) and Agricultural Engineering Technology and Business (AETB) majors. The mean age of the students in the sample was 21.1 years; however, one student was 39 years of age which was uncharacteristic for the rest of the sample. The mean number of education years of the students in the sample was 14.2 years, making them mainly sophomores and juniors.

Instrumentation

Instruments for this study consisted of three course thinking exercises, the Group Embedded Figures Test (GEFT) and the Sternberg-Wagner Thinking Styles Inventory (SWTSI). Field-independence and dependence were measured using the GEFT that was developed by Witkin et al. (1971). The GEFT is a standardized instrument whose reliability and validity have been established. Witkin et al. (1971) reported a Spearman-Brown reliability coefficient of .82 on the GEFT. An example of the type of tasks found on the GEFT is illustrated in Figure 1.

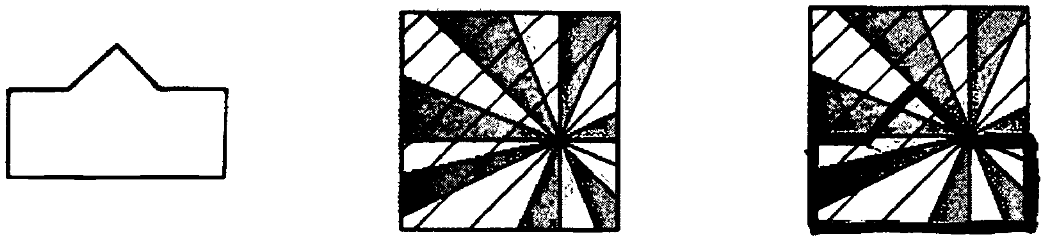


Figure 1. Example task from the GEFT instrument
Source: Witkin, H.A., Oltman, P.K., Raskin, E., & Karp, S.A. (1971). Group embedded figures test manual. Palo Alto, CA: Consulting Psychologist Press, Inc.

Thinking styles were assessed using the Sternberg-Wagner Thinking Styles Inventory. An abbreviated form (56 items) of this instrument was taken with the author's permission from the author's book "*Thinking Styles*" (Sternberg, 1997). This instrument returns six categorical levels of strength (very low to very high) on each subscale of the instrument. The abbreviated questionnaire included eight statements on each subscale including executive, legislative, judicial, global, local, internal and external. The student used a scale of 1-7 to rank the degree to which the statements were reflective of the way they think. The following examples illustrate the types of statements found on the SWTSI and the corresponding style of mental self-government:

- I like situations where I can use my own ideas and ways of doing things. (Legislative)
- I enjoy working on things I can do by following directions. (Executive)
- I like to check and rate opposing points of view or conflicting ideas. (Judicial)
- I tend to pay little attention to details. (Global)
- I tend to break down a problem into many smaller ones that I can solve, without looking at the problem as a whole. (Local).
- I like to control all phases of a project, without having to consult others. (Internal)
- When starting a task, I like to brainstorm ideas with friends or peers. (External)

In an effort to shorten the 104 item original Thinking Styles Inventory (TSI) (Sternberg & Wagner, 1992), the researchers elected to omit questions corresponding to Sternberg's other two styles (forms and leanings). For their college sample, Sternberg and Grigorenka (1993) reported scale reliabilities ranging from .56 to .88 (with a median of .78) on the 104 item TSI. The TSI has also been examined against other inventories based on different theories of thinking (such as the Myers-Briggs Type Indicator). Results from these construct validity studies have confirmed that the TSI is a reliable and valid instrument for examining thinking styles (Zhang, 1999).

Three scores on course thinking exercises were also utilized as instruments. Five faculty members from two Mississippi State University departments analyzed the course thinking exercises and marked them as being related to Sternberg's executive style, Sternberg's legislative style, Sternberg's judicial style or not related to Sternberg's theory of mental self government. After this, the researchers used the three thinking exercises where the faculty members agreed upon a consensus. Illustrated in Table 2 are the three thinking exercises along with a description and the related function of mental self-government.

Table 2.
Description of Course Thinking Exercises

Thinking Exercise	Description	Related Function of Mental Self-Government
Water, Water Everywhere	▪ *"You have two jugs with no markings (one holds 5 gallons and one holds 3 gallons). You need exactly 7 gallons of water from a faucet, how can you do it?"* ▪ Mathematical-type solution	Executive
Allais Paradox	▪ students given two alternatives based on unknowns ▪ students had to decide between the alternatives and provide a rationale ▪ *"Would you rather have a 10% chance of $1 million dollars and a 1% chance of $1 million **OR** a 10% chance of $2.5 million and a 1% chance of nothing?"*	Judicial
Lateral Thinking Puzzle	▪ presented students with a scenario ▪ *"A man is running along a corridor with a piece of paper in his hand. The lights flicker and the man drops to his knees and cries out, "Oh no!"* ▪ required students to generate creative solutions and tell a story	Legislative

Data Analysis

Data were analyzed using SPSS 8.0® software. Data for question one were descriptive in nature and included the use of frequencies, percentages and measures of central tendency. Data for questions two, three and four required a Pearson product-moment correlation to be drawn using interval strength data (raw scores) of the GEFT, SWTSI and thinking exercises. Strength of correlations were interpreted and reported using the Davis convention (Davis, 1971). An alpha level of .05 was established *a priori.*

ERIC

RESULTS

Question One: *How can the sample be described in terms of Sternberg's thinking styles and the Group Embedded Figures Test?*

Results from the GEFT instrument indicated that 19 of the 30 participants were field-dependent (M = 9.4, SD = 5.6, Range = 0-18). Results from the SWTSI were recorded using Sternberg's levels of strength to categorize the students' responses. Table 3 portrays the sample in terms of both the GEFT and SWTSI instruments.

Table 3.
Frequency of Field Independence/Dependence within categorized SWTSI scores (n = 30)

Thinking style	SWTSI categorization (*n*)					
	Very Low	Low	Low Middle	High Middle	High	Very High
Executive	6	3	5	6	5	5
Field-Dependent	3	1	3	4	4	4
Field-Independent	3	2	2	2	1	1
Judicial	5	3	6	8	6	2
Field-Dependent	2	2	4	5	5	1
Field-Independent	3	1	2	3	1	1
Legislative	0	2	7	10	7	4
Field-Dependent	0	1	5	7	5	1
Field-Independent	0	1	2	3	2	3
Global	0	1	4	5	16	4
Field-Dependent	0	0	1	4	10	4
Field-Independent	0	1	3	1	6	0
Local	5	0	5	9	5	6
Field-Dependent	2	0	3	5	4	5
Field-Independent	3	0	2	4	1	1
External	7	1	13	4	1	4
Field-Dependent	2	1	8	3	1	4
Field-Independent	5	0	5	1	0	0
Internal	2	0	6	5	10	7
Field-Dependent	2	0	2	3	9	3
Field-Independent	0	0	4	2	1	4

BEST COPY AVAILABLE

Question Two: *What is the relationship between the SWTSI and performance on thinking exercises which relate to those thinking styles?*

Table 4 highlights the important and statistically significant correlations that were found.

Table 4.
Correlations among thinking exercises and the SWTSI instrument (n = 30)

Correlation	Strength (r)	Davis interpretation
Executive task and Executive SWTSI score	.094	Negligible
Legislative task and Legislative SWTSI score	-.203	Low
Judicial task and Judicial SWTSI score	-.198	Low
Executive & Judicial tasks	.513**	Substantial
Executive & Legislative tasks	.606**	Substantial
Executive task & External SWTSI score	-.428*	Moderate
Judicial & Legislative tasks	.475*	Moderate
Judicial task & Local SWTSI score	-.540**	Substantial
Legislative task & Judicial SWTSI score	-.418*	Moderate
Legislative task & Global SWTSI score	-.411*	Moderate
Legislative task & External SWTSI score	-.490*	Moderate

** indicates significance at the .01 level (2-tailed)
* indicates significance at the .05 level (2-tailed)

Question Three: *What is the relationship between student scores on the GEFT instrument and performance on the course thinking exercises?*

Low-strength correlations were detected among the students' GEFT scores and scores on the three thinking exercises (Executive, $r = .266$; Judicial, $r = .105$; Legislative, $r = .105$).

Question Four: *What is the relationship between student scores on the GEFT instrument and the SWTSI instrument?*

Table 5 portrays the correlations detected among the students' SWTSI and the GEFT scores.

Table 5.
Correlations detected among the GEFT and SWTSI instruments (n = 30)

	Correlation with GEFT	Davis interpretation
Executive SWTSI	-.354	Moderate
Legislative SWTSI	.153	Low
Judicial SWTSI	-.103	Low
Global SWTSI	-.156	Low
Local SWTSI	-.310	Moderate
External SWTSI	-.392*	Moderate
Internal SWTSI	.134	Low

* indicates significance at the .05 level (2-tailed)

CONCLUSIONS

With a sample size of 30 students, Sternberg's thinking style does not appear to be related to students' ability to solve differing types of thinking exercises, nor does it appear to be highly related to the student's degree of field-independence and field-dependence. The fact that substantial positive correlations were detected among the three functions of mental self-government (legislative, executive and judicial) was worrisome and led the researcher to question the validity and reliability of the SWTSI instrument in this research setting. The literature on the theory of mental self-government asserts that if a person were more highly executive, they would score higher on executive-type tasks and not score as well as on legislative and judicial measures. However, this is contrary to what was found in this study.

The substantial inverse relationship that was detected between the students' score on the judicial task and the local SWTSI score was supported by the literature in that local-oriented persons often make decisions without perhaps seeing the larger picture. Additionally, the moderate inverse relationship that was found between the students' GEFT score and external SWTSI score was consistent with the literature in that highly field-independent persons tend to be more introverted in nature. The remaining correlations contradicted the review of the literature. One may question the degree to which student motivation to achieve a good grade on the thinking exercises overcame the student's given abilities.

RECOMMENDATIONS

It is recommended that this research be replicated with a larger sample size in order to get an accurate picture of the true relationships that may exist in this area. Additionally, future work should attempt to obtain not only a larger sample, but a random sample as well. Riding and Staley (1998) may have been correct in that current educational schemes neglect the role of motivation. Accordingly, another recommendation would be to insure that the outcomes of the student's score on the thinking exercises are not related to their course grade. In doing this, the researcher may be able to get a more accurate picture of the students' raw abilities. When students are completing tasks as part of a course grade, this motivation may well help students to overcome any prior thinking weaknesses in one area (for example, creativity).

Future research also needs to examine the instruments used to capture thinking styles and field independence and dependence. In the case of this study, the GEFT uses an ability-type assessment, where the student can either find the simple embedded figure or not. However, the SWTSI uses a self-reported type of score, whereas the students rank themselves. More research is needed to determine if persons taking the SWTSI tend to be too generous when self-reporting their abilities.

ERIC Full Text Provided by ERIC

REFERENCES

Bracey, G. W. (1995). Taking tests with style. Phi Delta Kappan, 76 (10), 814-821.

Canino, C., & Cicchelli, T. (1988). Cognitive styles, computerized treatments on mathematics achievement and reaction to treatment. Journal of Educational Computing Research, 4, 253-264.

Davis, J. A. (1971). Elementary survey analysis. Englewood Cliffs, NJ: Prentice Hall.

Fergusson, L. C. (1992). Field independence and art achievement in mediating and non-mediating college students, Perceptual and Motor Skills, 53, 8-10.

Grigorenko, E. L., & Sternberg, R. J. (1997). Styles of thinking, abilities, and academic performance. Exceptional Children, 63 (3), 295-312.

Riding, R., & Staley, A. (1998). Self-perception as learner, cognitive style and business. Assessment & Evaluation in Higher Education, 23 (1), 43-59.

Sternberg, R. J. (1997). Thinking styles. New York, NY: Cambridge University Press.

Sternberg, R. J. (1990). Learning and thinking styles: Classroom interaction. In R. McClure (Ed.), NEA School Restructuring Series. Washington, D.C.: National Education Association.

Sternberg, R. J., & Grigorenko, E. L. (1993). Thinking styles and the gifted. Roeper Review, 16 (2), 122-131.

Sternberg, R. J., Wagner, R. L. (1992). Thinking styles inventory. Unpublished test.

Tinajero, C., & Paramo, F. (1997). Field dependence-independence and academic achievement: A re-examination of their relationship. British Journal of Educational Psychology, 67 (2), 199-212.

Witkin, H.A. (1976). Cognitive style in academic performance and in teacher-student relations. In S. Messick & Associates (Eds.), Individuality in learning (pp. 38-72). San Francisco: Jossey-Bass.

Witkin, H.A., & Goodenough, D.R. (1981). Cognitive styles: Essence and origin. New York: International Universities Press.

Witkin, H.A., Oltman, P.K., Raskin, E., & Karp, S.A. (1971). Group embedded figures test manual. Palo Alto, CA: Consulting Psychologist Press, Inc.

Zhang, L. (1999). Further cross-cultural validation of the theory of mental self-government. Journal of Psychology Interdisciplinary & Applied, 122 (2), 165-182.

THE RELATIONSHIP BETWEEN THINKING STYLES, FIELD DEPENDENCE AND INDEPENDENCE, AND STUDENT PERFORMANCE ON SELECTED THINKING EXERCISES IN AN UNDERGRADUATE AGRICULTURE COURSE

A Critique

Carol A. Conroy
Cornell University

Sexton and Raven make an effort in this study to take learning styles research to a higher level by attempting to identify relationships between field independence/dependence, thinking styles, and performance, and thinking exercises among a select group of undergraduate students at Mississippi State University. The rationale for conducting the study is that students possess an array of thinking and learning styles and that this has tremendous implications for the impact of teacher behaviors on student performance. The authors provide a discussion of both field independence/dependence and thinking styles to build a theoretical framework for the study. The framework would have been enhanced by the addition of some references to characterize just what scholars consider learning and thinking to be, and whether there is, at present, any known relationship between the two. There is some mention of this in the latter portions of the literature review, but those are references to the specific instruments to be used in the study. In addition, the authors should consider reducing the emphasis on the instruments in the presentation of the theoretical framework and moving that discussion to the methods section. This would free up additional space for more theoretical discussions of learning and thinking.

The purpose of the study is clearly articulated, as are several research questions. However, there is no discussion of the population used for the study, or the rationale for selection of the particular sample. In addition, the authors do not discuss the effects of using a non-probability or convenience sample and the small number of participants on their selection of data collection, analysis, and reporting techniques. There are two definite sides to the argument of whether significance testing is an appropriate analysis for this data; at the very minimum, the sample should have been carefully conceptualized to represent a particular population and limitations to generalizations noted.

The data analysis was interesting to read, and much food for thought can be gleaned from it in terms of further characterization of students interested in agriculture studies as well as how they think. I would like to see a more in-depth treatment of the conclusions and implications of this study to not only future research, but also anticipated classroom practice with the subjects of the study. Did the researcher, or the faculty member responsible for instruction with this group make any substantive changes in delivery of materials as a result of this study? Have any conversations with students occurred? Answers to these questions would take the results of the research to the level of impact on classroom practice. Some other, general questions about learning styles research can be posed to drive future studies:

- How or what are we supposed to do with the results of learning styles research? In other words, what do we do if learning style is related to choice of major? Isn't it predictable, i.e., engineers and economists are usually field independent? Is this a surprise? What are ways that individuals within agricultural education can use the results of the research to

improve their practice? Wouldn't it be useful to investigate the suggested improvements using a quasi-experimental design to determine if student achievement is improved?

- Given the historically low correlations found with learning styles research, is there perhaps a measurement issue with grouping measurements designed as an individual diagnostic tool, and lumping them into a common pool? What is the "average" independent learner, for instance?
- Does the collapse of a continuous score into two nominal categories, such as is done in the GEFT, reduce the amount of variability within the dependent and independent learners? If so, would other forms of measurement, not based on two categories, have the same problems? Why is GEFT the preferred instrument used in agricultural education learning styles research?

The authors are to be commended for thinking of learning styles theory and research in a new and creative way.

NAERC '99 Research Fresh from Florida

On-Campus Agricultural Student Perceptions of WWW Supported Instruction

Tim Murphy
Texas A&M University

Joe Karasek
Texas A&M University

INTRODUCTION AND THEORETICAL FRAMEWORK

Three years ago, Newman, Terry, and Raven (1995) reported that very few professors in agriculture had courses on the World Wide Web (WWW). During the past three years, this perception has changed. Today many believe that most successful college programs will soon need to go to the students, wherever they are (Barlow, 1998). While not in a leadership position, the field of agriculture certainly seems to be represented in the on-line community. Peterson's Distance Learning Guide (1999) currently provides links to 55 institutions that offer courses in agriculture on-line. The Communications, Learning and Assessment in a Student-centered System (CLASS) program is a $10 million dollar project to create an accredited high school on-line. The University of Nebraska-Lincoln already has nine of the 55 courses proposed (UNL, 1999) open for enrollment. There are so many on-line courses and programs available that choosing among them has become a topic of concern in the popular press (O'Brien, 1998).

While it may be growing rapidly, it is useful to remember that the instructional use of the Web is still an extremely new practice. Consequently, there has been little research in agricultural student perceptions of course websites. Day, Raven, & Newman (1997) report that while students in AEE3203: Technical Writing in Agricommunication taught using a web-dependent delivery strategy scored higher on their final technical report than did those taught using traditional methods, they actually scored lower on a measure of their attitude toward computers. Terry and Briers (1996) report that while only slightly over half of them made use of it, "students'

ERIC

perceptions about the AGED 440 website were positive" (p. 76). In the same study, Terry and Briers report that students "were most positive about the on-line grade checking function, instructor information, and the availability of lecture notes from the website" (p. 76).

These on-line classes and programs constitute new environments for teaching and learning, and little research has been done to determine their characteristics. Murphy and Terry (1998) found that instructors in a college of agriculture believed that educational technologies would change how they taught within five years. If instructors are to effect positive change in their teaching, more research into the nature of effective and efficient learning and teaching in these new environments will be necessary.

One problem hindering research in this area is the lack of a common language for describing these learning environments. Courses described as "Web-based" run the gamut from a single link to a two-year old syllabus to complete presentations of illustrated and animated content supplemented with fully interactive on-line videoconferencing.

The Frontiers in Education homepage (OSU, 1999) suggests a hierarchical organization of the instructional uses of the Web. They chose to organize courses into four categories based on the degree or extent to which the Web was used as a delivery mechanism in support of the instructional process. These were, Fully Developed, the entire course is on WWW; Dependent, major components of the course are on the WWW but other delivery methods are required; Supplemental, links are provided to other resources; and Informational, where some course information is available. Day, Raven, & Newman (1997) used an earlier version of this organization in their study.

Another problem is separating the HTTP from the hype. In this climate of dynamic change, expectations and projections may be running ahead of actual course offerings. The Frontiers in Education site (OSU, 1999) mentioned earlier lists only eight courses in the field of agriculture, and the World Lecture Hall (UT, 1999), a well-known site for accessing educational opportunities that recently dropped the single course listed in agricultural education, lists 12. How many courses are actually using the WWW instructionally? To what extent is using the WWW an instructional requirement?

The contribution of gender, as a variable in learner achievement in on-campus as well as technology-mediated learning environments, is poorly understood and remains a contentious issue (American Association of University Women, 1999; Bromley and Apple, 1998; Gray, 1992; McHaney, 1998). While many studies in this area have been criticized, the sheer weight of the accumulating evidence is difficult to ignore. In a recent study of 2,381 junior high and high school students in Texas, McHaney (1998) found that "Males have a higher personal affect for technology than females, but their understanding of technology's importance is very similar" (p. 161).

Dillman, Christenson, Salant, and Warner (1995) reported that the public now expects lifelong learning opportunities to be available from their land grant universities. Many universities have been moving to meet this expectation by creating electronically mediated courses and programs to be offered at a distance. These off-campus classes are supplanting classes formerly restricted to on-campus students. Much is known about the expectations of these off-campus students (Gubernik & Ebling, 1997). What impact is this electronic extension of the campus

ERIC

having on our on-campus students? Do they perceive the WWW as enhancing their learning process, or as a barrier to it? Do males and females differ in their perceptions of these course webpages?

PURPOSE AND OBJECTIVES

The primary purpose for this study was to determine the perceptions of on-campus agricultural students as to the usefulness of the World Wide Web as a vehicle for instructional delivery. Specific objectives included describing the students currently using the WWW, the benefits to learning they perceived the WWW to offer, and the extent to which they perceived the WWW as a requirement in their undergraduate curriculum. The researchers were also interested in any differences in these perceptions due to gender.

METHODS

Population: The population of interest for this study was all students in the college of agriculture at a land grant university. A sample of the population was surveyed. The sample was composed of intact courses selected to provide a population indicative of the College population in their class standing (e.g. freshmen, sophomore . . .) and academic major (e.g agricultural education, economics, biophysics . . .).

Instrumentation: The instrument used to collect data for this study was a three-part questionnaire designed by the researchers to be read by an OCR scanner. Part I of the questionnaire was designed to identify selected personal and professional characteristics of the respondents. The demographic variables included were gender, age, GPR, class standing, academic major, the number of courses they were currently taking, the number of those courses supported by a website, and the percentage of all College courses they believed were supported by websites.

Part II consisted of 11 statements with a five-point Likert-type response scale. The response choices were: 1 = "Strongly Disagree," 2 = "Disagree," 3 = "Neutral," 4 = "Agree," 5 = "Strongly Agree." Items in Part II were designed to measure the level of competence of students in the utilization of the WWW and the perceived value of these technologies to their learning processes.

Part III provided an opportunity for the students to select perceived benefits of course web pages, and the report degree to which using the WWW was a requirement in their courses. Six items describing benefits of course websites and four items indicative of the levels of required web support were provided.

A panel of five experts made up of faculty members from the Department of Agricultural Education and the Department of Educational Human Resource Development established content validity of the instrument. Selected students from Agricultural Education provided input on face validity and completed a pilot test of the instrument.

Collection of Data: Data were collected over a two-week period in the Fall Semester of 1998 during regular class sessions. The survey instrument was passed out along with #2 pencils and collected. Students absent from class were randomly sampled and contacted via phone. The final sample contained 1,005 usable instruments.

Analysis of Data: Data were analyzed using SPSS® for Windows version 8.0 software. Descriptive statistics were calculated for each variable. To attempt to control non-respondent error the data from respondents was compared with that from the late respondents contacted via telephone as suggested by Miller and Smith (1983). No significant differences were found between the groups.

Reliability was established by calculating Cronbach's Alpha. The alpha for the eleven items in Part II was calculated on the pilot instrument prior to collecting data and found to be .91. Post hoc reliability was calculated using the same techniques and found to be .86.

Descriptive statistics including frequencies, percentages, and means were used to summarize agreement or disagreement with statements related to student competence, the value of WWW supported instruction, and the level to which the WWW was required.

Analysis of variance (ANOVA) statistical procedures were conducted to test the null hypothesis that there would be no difference between the responses of male and female students.

RESULTS

Part I: Demographic Data: The 1005 students in the sample were 51% male and 48% female. Seven students failed to report their gender. Students enrolled in each of the 24 academic majors available in the College of Agriculture were represented in the sample. Their frequency in the sample is reported in Table 1.

Table 1
Academic Majors of Survey Respondents

f	Major	f	Major	f	Major
30	Agribusiness	46	Biochemistry	43	Nutritional Sciences
61	Agricultural Economics	27	Bioenvironmental Science	5	Plant and Environmental Soil Science
147	Agricultural Development	3	Dairy Science	13	Poultry Science
26	Agricultural Science	10	Entomology	13	Rangeland Ecology and Management
43	Agricultural Engineering	1	Floriculture	18	Recreation, Park, and Tourism Sciences
6	Agricultural Journalism	12	Food Science and Technology	63	Wildlife and Fisheries Sciences
40	Agricultural Systems Management	2	Forestry	51	GEST (General Studies)
31	Agronomy	43	Genetics	9	COALS (College of Ag. and Life Sciences)
182	Animal Science	29	Horticulture	49	Non – COALS Major

ERIC

The class standings of those in the sample were 423 Freshmen, 130 Sophomores, 228 Junior, 216 Seniors, and 4 graduate students. Four students failed to report a class. Three students failed to choose a range for their age. Of those who did, 80.4% were between 18 and 21, 16.8% were between 22 and 25, 1.6% were between 26 and 29, and .9% reported being over 30. Their mean, self-reported grade point ratio (GPR) was 3.07.

In comparing the sample to the population of interest, freshmen were clearly over represented. However, the balance between upper division (junior/senior) and lower division (freshman/sophomore) students was similar to the population. On the other selected demographic variables, the sample accurately reflected the population. The three academic majors with the largest enrollments in the College, namely Animal Science, Agricultural Economics-Business, and Agricultural Education (Agricultural Development and Agricultural Science) were adequately represented.

About 46% of the courses in the College of Agriculture were supported by websites. The students reported being enrolled in an average of 5.33 courses. Of these, the mean number that included web support was 2.45. This compared favorably with the average student's perception that 41-60% of the courses in the college involved web support.

<u>Part II the Instructional Use of the WWW</u>: Students use the WWW often (79.4% agree or strongly agree). They perceive the WWW to be a valuable tool to access current events (90.2% agree or strongly agree) and research materials (86.0% agree or strongly agree). They perceive the WWW to be a valuable method to communicate with others (86.9% agree or strongly agree), and a valuable source of leisure activities (79.8% agree or strongly agree).

As a means of accessing course content, students perceive that the WWW is effective (81.4% agree or strongly agree) and efficient (77.9% agree or strongly agree). While slightly less certain, they believe the WWW is a convenient method of accessing course content (73.9% agree or strongly agree).

The students in this study (65.7%) disagree or strongly disagree that course websites create an additional burden for them. They (65.9%) disagree or strongly disagree that course websites are difficult to use.

The expectations of students as to the instructional utility of the WWW are perhaps best represented by the following item. "Well done course websites create additional interest in learning course material." On this item, 17.2% strongly agreed and 45.6% agreed while 4.3% disagreed and .5% strongly disagreed. Murphy and Terry (1998), in reporting similar survey data, suggested that those holding neutral opinions, as reflected by the center of the Likert scale, were unlikely to act on those beliefs. Looking at either end of the scale, the students likely to act (to use the WWW to improve their learning environment) greatly outnumber those who will not.

<u>Part III: Benefits of the WWW</u>: Students were asked to choose from among six statements following the question, "How do you benefit from course webpages?" Respondents were allowed to choose all the benefits they believed applied. Over half (51.2%) of the students believe that course websites make learning "more convenient for me." They believe that the using the

technology saves them time (45.1%). Students (42.2%) perceive that they "gain practical experience in using current technology" from these websites. Many (39.6%) felt that the website created "more effective or efficient communication between me and the instructor." Fewer (29.0%) believe that course websites "increase my awareness of current technology." A minority (10.5%) responded that they do not benefit at all from course websites.

The researchers were interested in the extent to which existing course websites were a requirement of the courses they supported. Students were again allowed to choose all that applied, and many did, apparently expressing variability among the level of required web usage among the (mean = 2.45) course websites they interacted with. Slightly more than a third (37.2%) reported that the website was not required at all. Another 31.9% reported that the website contained the same information presented in class. Of the two levels of required access, 24.3% reported that students were required to interact on the WWW to research a topic, work an assignment, etc. The highest level of requirement, where some required course materials and assignments were only available on the web, was chosen by 34.8% of respondents.

Gender Differences: ANOVA tests detected statistically significant differences in the perceptions of students based on their gender. For the statement, "I use the WWW often" the mean score for females was 4.14 on a five point Likert scale, while the score for males was 3.98. The average score for females on the statement, "The WWW is a valuable tool to access methods of communication with others" was 4.55, whereas males scored 4.23. The statement "Well done course websites create additional interest in learning course material" garnered a 3.81 from females and a 3.68 from males. While small, these statistically significant differences were important to the researchers because as a group they tend to imply that female college students appreciate and benefit from course websites at a rate equal to or greater than their male counterparts. Two additional items tend to support this finding. When asked to select ways they benefited from course webpages, 13.1% of males indicated "Not at all," compared to 7.8% of females. On another question, 46.0% of females indicated that course webpages provide them with "More efficient or effective communication between me and the teacher," while 33.8% of males chose that item as a benefit. It was telling that there was not a single instance of a statistically significant difference between the two groups in which males rated an item more positively than did females. Selected ANOVA results are reported in Table 2.

ERIC

Table 2
Gender Differences in Student Perceptions of Course Websites.

Statement	Source	df	Mean Square	F	p
I use the WWW often.	Between	1	6.40	6.68	.010
	Within	997	.958		
	*Total	998			
The WWW is a valuable tool to access methods of communication with others.	Between	1	25.068	43.00	.000
	Within	997	.583		
	*Total	998			
Well done course websites create additional interest in learning course material.	Between	1	4.411	6.82	.009
	Within	997	.646		
	*Total	998			
I do not benefit from course web pages at all.	Between	1	.698	7.40	.007
	Within	997	.094		
	*Total	998			
Course webpages provide more efficient or effective communication between me and the teacher.	Between	1	3.664	15.51	.000
	Within	997	.236		
	*Total	998			

* Seven students failed to report a gender.

CONCLUSIONS

Agricultural students found the WWW to be a valuable tool when used in support of the instructional process. They did not perceive the WWW to be an additional burden in the learning process, nor did they find it difficult to use. The WWW was an effective and efficient method to (a) access information on current events, (b) research materials, and (c) communicate with others. Websites, created to support a course, benefited students by making learning more convenient, and saving them time. Course websites were perceived as providing additional benefit by helping students gain practical experience using current technology, and providing more effective and efficient communications with their instructors. A majority of the students agreed that "well done course websites create additional interest in learning course material."

While all students reported benefiting from course websites, males and females benefited in different ways and amounts. In every case, females placed a higher value on the WWW as an instructional tool. While all the differences reported were statistically significant, those that were most significant ($p < .000$) were found on the statements dealing with the increased opportunities for communication available through course webpages. Female students appreciated this perceived benefit of course websites much more strongly than did their male counterparts. This study fails to support the popular conclusion that females are disproportionally disenfranchised by educational technology.

In this study, agricultural students perceived that they benefited from course websites. Other studies have found that students in a web supported learning environment perform better than those in a traditional settings in a technical writing in agriculture course (Day, Raven, & Newman, 1997), and a statistics course (McCollum, 1997).

RECOMMENDATIONS

Based on these findings and conclusions, the development of course websites should be encouraged among agricultural faculty and their effect on learning should be evaluated in additional content areas in agriculture.

Specific components or features of effective course websites should be identified and evaluated with respect to learner satisfaction and outcome measures of learning. Website components that encourage and facilitate instructor-student communications should be evaluated to determine if male and female students benefit differently from them on outcome measures of student learning.

The obstacles to adopting other technologically mediated delivery systems have been explored (Dillon & Walsh, 1992; Jackson & Bowen, 1993, Murphy & Terry 1998). Additional studies should be conducted to identify barriers to the adoption of course websites.

There is some danger that the perceived benefit of these technologies was due, wholly or partly, to their newness. This study should be replicated in other locations and over time to minimize the possible effects of this phenomenon.

Additional research in this area will be facilitated through the development of a common descriptive language. In order to facilitate discussion of the instructional value of the WWW as a delivery medium for agriculture education, the following classification model is recommended. This simplified three-level classification model is based on the Oregon State University scheme (OSU, 1999) with the additional dimension of the level of *required* access to WWW resources. In this scheme, courses delivered entirely over the WWW are called Web Delivered. Courses that meet off-line but have required components (reading assignments, activities) available only via the WWW are called Web Dependent. Courses that use the WWW as an *additional* channel to deliver materials and information or provide access to *non-required* instructional resources or information are called Web Enhanced.

Murphy and Terry (1998) found that instructors in a college of agriculture believed that educational technologies would change their methods of teaching within five years. The constructivist ideas of redefining the role of instructor from "sage on the stage" or presenter of content, to "guide on the side" or organizer of educational opportunities and experiences, continue to gain momentum. Course websites are gaining acceptance as a useful tool in this transition.

REFERENCES

American Association of University Women (1999). Gender gaps : where schools still fail our children. New York : Marlowe & Co.

Barlow, J. (1998, Mar. 15). Colleges going to the students. Houston Chronicle. pp. D1, D3.

Bromley, H., & Apple, M. (1998). Education, technology, power : Educational computing as a social practice. Albany, NY : State University of New York Press.

Day, T., Raven, M., & Newman, M. (1997). The effects of world wide web instruction and traditional instruction and learning styles on achievement and changes in student attitudes in a technical writing in agricommunications course. Proceedings of the 24th National Agricultural Education Research Meeting. 24, pp. 167-173.

Dillon, C., & Walsh, S. (1992). Faculty:The neglected resource in distance education. The American Journal of Distance Education. 3, (6), 5-21.

Gubernick, L., & Ebeling, A. (1997, June 16). I got my degree through e-mail. Forbes. pp. 84-87, 90, 92.

Gray, J. (1992). Men are from Mars, women are from Venus : a practical guide for improving communication and getting what you want in your relationships. New York, NY : HarperCollins.

Jackson, G. & Bowen, B. (1993). A conceptual model for effectively planning and delivering distance education courses and programs in agriculture. Proceedings of the 20th National Agricultural Education Research Meeting. 20, Nashville, TN.

McCollum, K. (Feb. 21, 1997). A professor divides his class in two to test value of on-line instruction. Chronicle of Higher Education. 43, (24). p. A23.

McHaney, L. (1998). An analysis of factors that influence secondary students' attitudes toward technology. Unpublished doctoral dissertation, Texas A&M University: College Station, TX.

Miller, L. E. & Smith, K. L. (1983). Handling nonresponse issues. Journal of Extension, 21(5), 21-23.

Murphy, T. & Terry H. (1998). Faculty needs associated with agricultural distance education. The Journal of Agricultural Education. 39, (1) 17-27.

Newman, M., Terry, R., & Raven, M. (1995). Surfing the internet: Ag style. Annual meeting of the American Association for Agricultural Education at the American Vocational Association Convention, Denver, CO.

O'Brien, S. (1998, Dec. 4-6). Earn college credits. Skip the commute. USA Weekend. pp. 20-21.

OSU. (1999). Frontiers in education homepage. <http://osu.orst.edu/fe/extedu/couvia/> (Accessed 1/5/1999).

Peterson's (1999). The distance learning channel. <http://www.petersons.com/dlearn/> (Accessed 1/5/1999).

Terry, R. & Briers, G. (1996). Case analysis of a website for an agricultural education course. Proceedings of the 23rd National Agricultural Education Research Meeting. 23, pp. 67-78.

UNL. (1999). CLASS homepage. <http://class.unl.edu/> (Accessed 1/5/1999).

UT. (1999). World Lecture Hall:Agriculture. <http://www.utexas.edu/world/lecture/agriculture/> (Accessed 1/5/1999).

ON-CAMPUS AGRICULTURAL STUDENT PERCEPTIONS OF WWW SUPPORTED INSTRUCTION

A Critique

Carol A. Conroy
Cornell University

Murphy and Karasek engaged in a study to examine the perceptions of students enrolled in the college of agriculture at a major land grant university about the usefulness of the World Wide Web as a delivery vehicle for instruction. They were particularly interested in students' perceptions of benefits of using the WWW and its requirement as part of the core undergraduate curriculum. They were also interested in whether these perceptions may differ by gender of the student.

The theoretical framework is well-written and provides an interesting overview of the use of distance education for instruction at the university level, but it often appears disjointed. It was difficult for me to understand how the framework related to the title of the study and the subsequently identified purpose and objectives. If the authors plan to submit this study for journal publication, they should give some thought to reorganization of the theoretical framework. Perhaps it is just a matter of some expansion and the use of some headings, along with a summary leading to the purpose and objectives.

The population and sample are described and the non-probability sample described in the context of the population it was intended to represent. This section could have been more detailed as I am curious as to how the authors selected courses that would provide a "population indicative of the College population in their class standing" (I think the authors meant sample, here). This is especially important when tests of statistical significance are used for the data analysis. A well-written description of the survey instrument was provided, as well as description of the data collection and analysis procedures. Some additional information about the theoretical framework or literature base utilized to develop the actual questionnaire would have been helpful.

I thoroughly enjoyed reading the Results section which was partly due to the way it was written. I found the narrative descriptions of the results to be concise, yet easily understood and "user-friendly." The fact that the authors did not duplicate information presented in the narrative in tables permitted the use of more space for discussion of results. As previously indicated, understanding the source of some of the survey statements/questions would be helpful.

I certainly appreciate the interest in the gender differences issues, but am not certain that the authors explored these relationships in the presentation of the theoretical framework or in the data analysis to the fullest extent possible. Had they considered interviewing a group of students to determine why some notable differences occurred in the cited benefits of using web pages for males vs. females? Why do the authors believe that it is telling that there was not a "single instance of a statistically significant difference between the two groups in which males rated an item more positively than did females?" Was there indication in the literature that males should rate higher on this type of scale than females? The authors cite popular conclusions, but don't indicate from where those are derived.

The Conclusions and Recommendations sections were also well written. They would have been greatly enhanced by a section that discussed the implications for the findings of this study to the authors' institution and for education, in general. All in all, though, I thoroughly enjoyed reading this paper. Understanding how students feel about the use of course web pages as an instructional tool can assist us with their use and development, particularly if we know they are viewed positively by a majority of students, as was the case in this study.

ERIC

NAERC '99
Fresh Florida

A Comparison of Full-Time and Part-Time Students by Delivery System and Study Location in a Graduate Level Research Design Course

Laura Griffeth
Mississippi State University

James Key
Oklahoma State University

INTRODUCTION/THEORETICAL BASE

Agricultural educators have the ability to develop and improve the method and process of technology-mediated instruction (Newcomb, 1993). Educators must know their audience, identify effective distance education practices, and tailor programs to meet the needs of their audiences (Miller & Honeyman, 1993). Teaching any course by distance education involves much more than simply teaching with a camera recording or broadcasting the class. Thorough planning and new skills must be developed as instructors move from traditional classroom teaching to distance education. Many of these in-service needs center on course planning and delivery, including methods of instruction, teaching techniques, timing, teacher/student interaction, feedback, printed supplemental materials, and evaluation (Kelly, 1990). These additional competencies and planning strategies are often transferred and incorporated into their traditional classes (Burnham, 1988; Willis & Touchstone, 1996).

One aspect of the audience that must be considered is enrollment status. Differences in learning and performance exist between full-time and part-time students. These may be due to many factors, including needs, motivations, learning attitudes, and existing knowledge and skill levels (McDowell, 1993; Starr & Walker, 1982). Most often, these differences might be further emphasized when dealing with graduate students. Graduate students are often older and, as adult students, have different maturity levels, experiences, readiness to learn, and learning orientations (Knowles, 1980).

Research indicates that the instructional format has little effect on student achievement as long as the delivery system is appropriate to the content and all students have access to the same technology. No significant difference in positive attitudes toward course material was apparent between distant and traditional education (Martin & Rainey, 1993; University of Idaho Engineering Outreach, 1995).

Research Design at Oklahoma State University is a graduate level course open to both masters and doctoral students from any major. The students are typically from Agricultural Education, Occupational and Adult Education, and Aviation and Space Education. The course is taught during Fall, Spring, and Summer semesters but by different delivery systems each semester. Students enrolled in the course during the Fall have the option to take the course at a distant site or on campus. This type of delivery system involves the use of satellite, compressed video, and fiber optics in the presentation of the course. Students enrolled in the course during the Spring are taught by traditional classroom delivery, which involves the use of more common, standard instructional techniques in the presentation of the course. Students enrolled in the course during the Summer are taught during a three week period by condensed time-frame delivery. This type of delivery system involves the same type of instructional techniques as the traditional classroom delivery system but is taught in three weeks instead of a full 16-week semester. A comparison of the effectiveness of these different delivery systems for full-time and part-time graduate students had not been conducted to determine if these students differed in their perceptions of attaining the objectives of the research design course.

PURPOSE AND OBJECTIVES

The purpose of this study was to compare full-time and part-time students' perceptions of their achievement of the course objectives.

The following objectives were established to achieve the purpose of the study:

1. To compare the perceived research, statistical, and computer knowledge and general course perceptions of full-time or part-time students receiving traditional classroom delivery, electronic distance education delivery, or condensed time-frame delivery
2. To compare the perceived research, statistical, and computer knowledge and general course perceptions of full-time or part-time students located on-site or off-site receiving electronic distance education delivery.

PROCEDURES

Population

The study included all graduate students who completed AGED 5980 Research Design at Oklahoma State University from Fall 1995 through Summer 1997. The population included 44 students during Fall 1995, 25 students during Spring 1996, 7 students during Summer 1996, 33 students during Fall 1996, 22 students during Spring 1997, and 12 students during Summer 1997 (total = 143 students). These included 47 students taught by traditional classroom delivery, 77 students taught by electronic distance education delivery (31 on-site and 46 off-site), and 19 students taught by condensed time-frame delivery.

Instrumentation

Student perceptions of their research, statistical, and computer knowledge were determined through a researcher-developed questionnaire. Response choices consisted of five-point Likert-type scales where 1 = no knowledge and 5 = very knowledgeable. The questionnaire was evaluated for content and face validity by a panel of experts from the Department of Agricultural Education, Communications, and 4-H Youth Development at Oklahoma State

ERIC Full Text Provided by ERIC

University and was pilot tested with former graduate students who completed AGED 5980 Research Design but were not part of the survey population. Cronbach's alpha was used to determine the reliability and ranged from .96 - .98 for each section.

Data Collection

Seventy-five questionnaires were returned during the initial data collection period beginning August 15, 1997, for a response rate of 53.6%. Follow-up of non-respondents was accomplished three weeks later through reminder e-mail messages for students with e-mail addresses and telephone calls for the remainder. Sixteen questionnaires were returned during the follow-up period which ended October 15, 1997. A total of 91 questionnaires were returned for a return rate of 65.0%. A subsampling of non-respondents was done to determine if differences existed between respondents and non-respondents (Van Dalen, 1979; Warde, 1990). Five non-respondents (10% of respondents) were randomly selected from the listing of non-respondents and were contacted by telephone to provide the needed information. The information collected from the five non-respondents was compared with information from the 91 respondents. No significant differences were determined, so the data from the non-respondents was pooled with the data from the respondents, giving a total of 96 questionnaires (68.6% return rate).

Data Analysis

All statistical analyses were conducted using SPSS for Windows 6.0 and Microsoft Excel 5.0 Data Analysis Package. Descriptive statistics were used in the analyses of this census study, including frequencies, means, and standard deviations.

RESULTS

Perceived Research Knowledge

As shown in Table 1, students rated their perceived research knowledge before taking Research Design at a mean of 2.31 and after taking Research Design at a mean of 3.82, a 1.51 increase in the mean of perceived research knowledge on a five point scale. Full-time students rated their perceived research knowledge before taking the course substantially higher than part-time students, but they rated it approximately the same as part-time students after taking the course. Full-time students perceived a lower increase in research knowledge than part-time students.

Table 1.
Perceived Research Knowledge of Full-time and Part-time Students by Delivery System

Source	N	%	Before Mean	Before S.D.	After Mean	After S.D.	Difference Mean	Difference S.D.
Overall			2.31	1.02	3.82	0.85	1.51	1.01
Full-time	46	47.9	2.51	1.00	3.85	0.86	1.34	0.95
Part-time	50	52.1	2.11	0.99	3.79	0.85	1.68	1.03
Full-time								
Traditional	21	45.7	2.61	0.91	3.93	0.80	1.32	0.91
Distance	14	30.4	2.55	1.15	3.94	0.82	1.39	1.06
Condensed	11	23.9	2.26	0.94	3.56	0.97	1.30	0.90
Part-time								
Traditional	10	20.0	2.04	1.01	3.96	0.79	1.92	1.02
Distance	36	72.0	2.11	0.99	3.69	0.85	1.58	0.98
Condensed	4	8.0	2.28	0.99	4.22	0.72	1.94	1.26

Full-time students receiving traditional classroom and electronic distance education delivery rated their perceived research knowledge higher than full-time students receiving condensed time-frame delivery, both before and after taking the course. Full-time students perceived a similar increase in their research knowledge in all three delivery systems. Part-time students receiving condensed time-frame delivery rated their perceived research knowledge after taking the course higher than part-time students receiving traditional classroom delivery, who in turn rated their perceived research knowledge higher than part-time students receiving electronic distance education delivery. Part-time students receiving condensed time frame and traditional classroom delivery perceived a greater increase in their research knowledge than part-time students receiving electronic distance education delivery.

Full-time students taking the course on-site rated their perceived research knowledge before taking the course drastically lower than full-time students taking the course off-site, but full-time on-site and off-site students did not differ in perceived research knowledge after the course (see Table 2). Part-time students taking the course on-site rated their perceived research knowledge before and after taking the course lower than part-time students taking the course off-site.

Table 2.
Perceived Research Knowledge of Full-time and Part-time Students by Study Location within Electronic Distance Education Delivery

			Before		After		Difference	
Source	N	%	Mean	S.D.	Mean	S.D.	Mean	S.D.
Full-time								
On-site	12	85.7	2.39	1.13	3.92	0.86	1.53	1.07
Off-site	2	14.3	3.53	0.63	4.04	0.47	0.51	0.34
Part-time								
On-site	10	27.8	1.99	1.00	3.40	0.96	1.41	1.11
Off-site	26	72.2	2.16	0.98	3.80	0.79	1.64	0.91

Perceived Statistical Knowledge

As shown in Table 3, students rated their perceived statistical knowledge before taking Research Design at a mean of 2.26 and after taking Research Design at a mean of 3.37, a 1.11 increase in the mean of perceived statistical knowledge on a five point scale. Full-time students rated their perceived statistical knowledge higher than part-time students, both before and after taking the course. However, part-time students perceived a greater increase in statistical knowledge than full-time students.

Differences existed between full-time students and part-time students receiving traditional classroom delivery, electronic distance education delivery, and condensed time-frame delivery, both before and after taking the course. Full-time students receiving traditional classroom delivery rated their perceived statistical knowledge higher than students receiving electronic distance education delivery or condensed time-frame delivery before and after taking Research Design. However, full-time students receiving electronic distance education delivery perceived a greater increase in statistical knowledge than full-time students receiving traditional classroom delivery and condensed time-frame delivery. Part-time students receiving electronic distance education delivery and condensed time-frame delivery rated their perceived statistical knowledge higher before the course than part-time students receiving traditional classroom delivery. Part-time students receiving condensed-time frame delivery rated their perceived statistical knowledge substantially higher after the course than part-time students receiving traditional classroom delivery or electronic distance education delivery, while part-time students receiving traditional classroom delivery rated their perceived statistical knowledge higher after the course than part-time students receiving electronic distance education delivery. However, part-time students receiving electronic distance education delivery perceived a lower increase in statistical knowledge than students receiving traditional classroom delivery and condensed time-frame delivery.

Table 3.
Perceived Statistical Knowledge of Full-time and Part-time Students by Delivery System

Source	N	%	Before Mean	Before S.D.	After Mean	After S.D.	Difference Mean	Difference S.D.
Overall			2.26	1.07	3.37	0.97	1.11	0.94
Full-time	46	47.9	2.63	1.10	3.52	1.05	0.89	0.93
Part-time	50	52.1	1.91	0.91	3.23	0.87	1.32	0.91
Full-time								
Traditional	21	45.7	2.87	0.97	3.62	1.06	0.75	0.88
Distance	14	30.4	2.42	1.26	3.51	1.07	1.09	1.09
Condensed	11	23.9	2.45	1.01	3.32	0.99	0.87	0.77
Part-time								
Traditional	10	20.0	1.77	0.87	3.32	0.70	1.55	0.78
Distance	36	72.0	1.92	0.92	3.11	0.87	1.19	0.86
Condensed	4	8.0	2.14	0.87	3.96	0.89	1.82	1.26

Full-time students taking the course on-site rated their perceived statistical knowledge before taking the course lower than full-time students taking the course off-site (see Table 4). On-site full-time students perceived a considerably greater increase in perceived statistical knowledge than off-site full-time students. Part-time students taking the course on-site rated their perceived statistical knowledge after taking the course lower than part-time students taking the course off-site. Off-site part-time students perceived a greater increase in statistical knowledge than on-site part-time students.

Table 4.
Perceived Statistical Knowledge of Full-time and Part-time Students by Study Location within Electronic Distance Education Delivery

Source	N	%	Before Mean	Before S.D.	After Mean	After S.D.	Difference Mean	Difference S.D.
Full-time								
On-site	12	85.7	2.35	1.30	3.56	1.09	1.21	1.10
Off-site	2	14.3	2.86	0.88	3.23	0.88	0.37	0.65
Part-time								
On-site	10	27.8	2.01	1.06	2.83	0.92	0.82	0.76
Off-site	26	72.2	1.89	0.87	3.22	0.83	1.33	0.86

Perceived Computer Knowledge

As shown in Table 5, students rated their perceived computer knowledge before taking Research Design at a mean of 3.13 and after taking Research Design at a mean of 3.78, a 0.77 increase in the mean of perceived computer knowledge on a five point scale. Full-time students rated their perceived computer knowledge higher than part-time students, both before and after taking the course. However, part-time students perceived a considerably greater increase in computer knowledge than full-time students.

Table 5.
Perceived Computer Knowledge of Full-time and Part-time Students by Delivery System

Source	N	%	Before		After		Difference	
			Mean	S.D.	Mean	S.D.	Mean	S.D.
Overall			3.13	1.29	3.78	1.03	0.65	0.94
Full-time	46	47.9	3.44	1.16	3.98	0.93	0.54	0.96
Part-time	50	52.1	2.78	1.34	3.61	1.08	0.83	1.15
Full-time								
Traditional	21	45.7	3.72	1.07	4.03	0.92	0.31	0.80
Distance	14	30.4	3.33	1.20	3.91	0.94	0.58	0.81
Condensed	11	23.9	3.25	1.01	3.77	0.94	0.52	0.73
Part-time								
Traditional	10	20.0	2.74	1.33	3.59	0.94	0.85	1.21
Distance	36	72.0	2.79	1.35	3.61	1.15	0.82	0.91
Condensed	4	8.0	2.92	1.53	4.31	0.66	1.39	1.57

Full-time students receiving traditional classroom delivery rated their perceived computer knowledge before taking the course higher than students receiving electronic distance education delivery and condensed time-frame delivery. However, perceived computer knowledge after the course did not differ considerably. Part-time students receiving condensed time-frame delivery rated their perceived computer knowledge after the course substantially higher than part-time students receiving traditional classroom delivery and electronic distance education delivery, even though the part-time students in each group did not perceived their computer knowledge before the course differently. Part-time students receiving traditional classroom delivery and condensed time-frame delivery perceived a greater increase in computer knowledge than part-time students receiving electronic distance education delivery.

Full-time students taking the course on-site rated their perceived computer knowledge higher than full-time students taking the course off-site, both before or after the course (see Table 6). Part-time students taking the course on-site rated their perceived computer knowledge after taking the course lower than part-time students taking the course off-site and perceived a lower increase in computer knowledge.

Table 6.
Perceived Computer Knowledge of Full-time and Part-time Students by Study Location within Electronic Distance Education Delivery

			Before		After		Difference	
Source	N	%	Mean	S.D.	Mean	S.D.	Mean	S.D.
Full-time								
On-site	12	85.7	3.36	1.19	3.97	0.90	0.61	0.84
Off-site	2	14.3	3.15	1.27	3.60	1.10	0.45	0.60
Part-time								
On-site	10	27.8	2.75	1.30	3.30	1.31	0.55	0.85
Off-site	26	72.2	2.80	1.37	3.72	1.07	0.92	0.87

General Course Perceptions

Respondents answered general questions about the overall course, instructor, delivery method, thoroughness of content, and skillfulness of the presentation. Full-time students did not differ in their perceptions of the overall course, but part-time students did perceive differences in the course, as shown in Table 7. Part-time students receiving electronic distance education delivery rated Research Design considerably lower than part-time students receiving traditional classroom delivery and condensed time-frame delivery.

Table 7.
General Perceptions of Full-time and Part-time Students by Delivery System

	Traditional		Distance		Condensed	
Source	Mean	S.D.	Mean	S.D.	Mean	S.D.
Overall	3.84	1.02	3.73	1.05	3.62	1.24
Full-time	3.70	1.06	3.65	1.07	3.39	1.20
Part-time	4.13	0.86	3.76	1.04	4.28	1.14

Additional Courses By Electronic Distance Education Delivery

When students receiving electronic distance education delivery were asked if they would take another course by the same method, fifty-eight percent of the students (29) responded yes, twenty-six percent of the students (13) responded no, and sixteen percent of the students (8) did not respond, as shown in Table 8. Twenty-nine percent of full-time students (4) and sixty-nine percent of part-time students (25) responded yes. Forty-one percent of on-site students (9) responded yes, while seventy-one percent of off-site students (20) responded yes. Written comments were primarily concerned with the convenience, accessibility, money-saving aspect of electronic distance education delivery, and instructor restriction due to the technology.

Table 8.
Additional Courses by Electronic Distance Education Delivery of Full-time and Part-time Students

	Yes		No		Did Not Respond	
Source	N	%	N	%	N	%
Overall	29	58.0	13	26.0	8	16.0
Full-time	4	28.6	4	28.6	6	42.8
Part-time	25	69.4	9	25.0	2	5.6
On-site	9	40.9	5	22.7	8	36.4
Off-site	20	71.4	8	28.6	0	00.0

CONCLUSIONS AND IMPLICATIONS

Overall, the full-time or part-time status of students affected the perceived increase in research, statistical, and computer knowledge in the Research Design course at Oklahoma State University. Part-time students consistently rated their perceived knowledge lower than full-time students, but part-time students perceived a greater increase in knowledge than full-time students. Part-time students appeared to enter the class with less knowledge but learned more during the class than full-time students.

In addition, students' perceptions of research, statistical, and computer knowledge and the overall course based on delivery system were not greatly affected by full-time status of students but was affected by part-time status of students. Part-time students receiving electronic distance education delivery perceived a lower increase in knowledge than part-time students receiving traditional classroom delivery or condensed time-frame delivery. Also, part-time students receiving electronic distance education delivery rated the overall course, instructor, delivery method, thoroughness of content, and skillfulness of presentation lower than part-time students receiving traditional classroom delivery or condensed time-frame delivery. Therefore, part-time students receiving electronic distance education delivery may need more attention than part-time students receiving traditional classroom delivery or condensed time-frame delivery.

When comparing students receiving electronic distance education delivery, full-time on-site students appeared to begin the course with lower knowledge perceptions than full-time off-site students. Part-time students perceived a similar level of knowledge before the course. However, full-time on-site students and part-time off-site students perceived a greater increase in research, statistical, and computer knowledge.

Students responded overwhelmingly that they would take another course by electronic distance education delivery or condensed time-frame delivery. The largest group responding favorably was part-time off-site students receiving electronic distance education delivery. Additional courses and off-campus degree programs should be developed to meet the needs of these part-time and/or off-site students.

Teaching by all three methods of delivery was effective for this Research Design course. Electronic distance education delivery was as effective a delivery system as traditional and condensed time-frame delivery. It is essential that formal and non-formal educational entities

continue to explore and utilize state-of-the-art delivery systems. Particular attention should be focused on the use of distance education delivery with part-time adult students. This could be significant to Extension programming with the increased use of longer instructional periods, such as Master Gardener and Master Cattlemen Programs. In addition, the use of condensed time-frame delivery merits more attention and possibly more use by other courses and programs.

Longitudinal evaluation should continue to determine further effectiveness of these delivery systems and students' satisfaction with the course and different delivery systems. Additional studies should be conducted with other research design courses at other institutions and in other disciplines. In addition, further experimental research should be continued with future students of AGED 5980 Research Design at Oklahoma State University to further explore the factors affecting students' perceptions and knowledge.

REFERENCES

Burnham, B. R. (1988). An examination of perceptions and motivations of faculty participating in a distance education project. Paper presented at the Teaching at a Distance Conference, Madison, WI. (ERIC Document Reproduction Service No. ED 304 133)

Kelly, M. (1990). Course creation issues in distance education. In D.R. Garrison & D. Shale (Eds.), Education at a distance: From issues to practice. (pp. 77-99). Malabar, FL: Robert E. Krieger Publishing Company.

Knowles, M. S. (1980). The modern practice of adult education. Chicago: Follett Publishing Company.

Martin, E. E., & Rainey, L. (1993). Student achievement and attitude in a satellite-delivered high school science course. The American Journal of Distance Education, 7(1), 54-61.

McDowell, L. (1993). Enterprise education and part-time students. Assessment and evaluation in higher education, 18(3), 187-204.

Miller, G., & Honeyman, M. (1993). Attributes and attitudes of students enrolled in agriculture off-campus videotaped courses. Journal of Agricultural Education, 34(4), 85-92.

Newcomb, L. H. (1993). Transforming university programs of agricultural education. Journal of Agricultural Education, 34(1), 1-10.

Starr, R., & Walker, J. (1982). A comparison of part-time and full-time degree students: The one-year residence program advisors' study. Journal of Education for Social Work, 18(2), 59-67.

University of Idaho Engineering Outreach. (1995). Distance education: Research. In: Distance Education at a Glance [on-line]. Available http://www.uidaho.edu/evo/dist10.html [26 May 1999].

Van Dalen, D. B. (1979). Understanding educational research (4th ed.). New York: McGraw Hill, Inc.

Warde, W. D. (1990). Sampling methods. Stillwater, OK: Oklahoma State University.

Willis, B., & Touchstone, A. J. L. (1996). A technological solution in search of an instructional problem. The Agricultural Education Magazine, 68(11), 4, 5, 9, 12.

A COMPARISON OF FULL-TIME AND PART-TIME STUDENTS BY DELIVERY SYSTEM AND STUDY LOCATION IN A GRADUATE LEVEL RESEARCH DESIGN COURSE

A Critique

Carol A. Conroy
Cornell University

Griffeth and Key studied differences in perceptions held by full-time and part-time students about their achievement in a graduate level research design course at Oklahoma State University during the period Fall 1995 through Summer 1997. They sought to examine these differences by both delivery systems and study location. The theoretical framework focused on distance education as a means of instruction and implications for its use, impacts of enrollment status on instructional design, and effects of instructional format on student achievement. The authors state that differences in learning and performance exist between full-time and part-time students, and cite various factors that lead to these differences, but do not provide any detailed information from the literature. Since enrollment status is the major variable under investigation in this study, and it is also indicated in the purpose of the study, more attention to it is warranted. The theoretical framework included a well-structured rationale. In fact, I would have liked to see this paragraph separated from the theoretical framework and identified as a "Statement of the Problem" or "Rationale for the Study."

A purpose and objectives for the study are provided. The purpose does not mention the issue of location as a major variable under consideration in the study although location is mentioned in the title of the study and is alluded to in the introductory paragraph of the theoretical framework. I would suggest that when the authors submit this study for journal publication they consider a restructured theoretical framework to thoroughly discuss the literature on enrollment status and tie location in as a factor of this as many part-time students take advantage of distance education offerings. This would also necessitate revised purpose statement(s) to include location.

The authors provided a well-structured discussion of the procedures followed in conducting the study. The population was described, as were the procedures for instrument development and reliability testing although it would have been helpful to have some information about the research base utilized for the development of the survey. The authors are to be commended for their excellent presentation of the procedures.

The Results section of this study was appropriately presented, with little duplication of information in the narrative and tables. This was helpful in that it provided more space for discussion of the results. The tables were well done, as well, and easy to read. The authors also did a good job of summarizing the data analysis in the narrative that was easy to read and understand.

I would caution the authors against making statements such as "substantially higher" and "approximately the same" (review of Table 1) without providing some basis for how those decisions were made. It is important to establish criteria prior to the analysis and to apply those across-the-board when analyzing the results. There is no indication of what criteria were used by the authors in decisions about what represented substantial differences, or what constitutes things being "the same."

ERIC

I have some concerns with some statements made in the Conclusions and Implications section that are more definitive than they should be for this study. As an example, I do not believe that the authors can conclude that part-time students "appeared to enter the class with less knowledge, but learned more during the class than full-time students." Their perceptions were that they entered with less knowledge, which could only be determined through the use of an actual assessment tool. I also do not believe that it can be concluded that perceptions were not "affected by" students' enrollment status. I think that the only thing the authors can conclude is that the perceptions were not markedly different for the two groups, but whether enrollment status was a cause of the perceptions is not able to be determined through the analysis conducted as part of this study. The authors should also take care in the use of the word "effective" and should define it as related to student perceptions of satisfaction and amount learned in the course as opposed to some other measure of performance.

All in all, the authors are to be commended for conducting a study that has vast implications as most institutions consider a move to offering more distance education and part-time programs.

A Course in a Box
"Making Dollars and Sense...Adding Value to Agricultural Products"

Poster Abstract

Roland Peterson
University of Minnesota

Justin Williamson
University of Minnesota

This new course, developed at the University of Minnesota, was designed to serve high school agricultural education students. The course was created as a means of having students begin to think creatively about what could be done with the enormous amount of raw agricultural products. Minnesota, not unlike every other state in the U.S., produces far more raw products from our agricultural industry than are consumed by people and for industrial uses. As a result, an enormous amount of agricultural commodities are sent to various parts of the world only to have value added through creative processing methods.

This course attempts to have high school students think critically about how they may create or improve an agricultural product. The course is centered around a performance package, which requires students to successfully complete each of the steps involved in creating an actual product. This is a "turn-key" course designed to be teacher friendly. All of the resources a teacher needs to deliver the course are provided. The resources are clearly marked and the entire course comes in a creatively designed box.

There are 10 instructional units in this proposed year-long course. Appropriate videotapes, attention-focusing materials, decision cases, student activity instructions/worksheets, and 62 lesson plans are provided.

Upon completion of this course, students will have completed three performance standards in the Minnesota Profiles of Learning. They will have created a product from an agricultural commodity, conducted a complete business and market plan, and had a chance to use their product in the FFA Agricultural Sales and Market Plan Career Development Events as well as to develop an SAE project. In addition, they will have had a real experience in adding value to an agriculture commodity.

A subcommittee of the Minnesota Agricultural Project (MAP) originally designed the course. Financial support was provided by AURI ($15,000), Land O'Lakes ($5,000), MN Corn Growers ($5,000), U of M-AgEd ($17,000), and U of M-AgEd ($17,000), for a total of $59,500.

The course is being marketed by Hobar Publications to agricultural education teachers across the U.S.A.

Course Description

This course will examine the social, economic, and scientific concepts related to adding value to raw and processed agricultural products.

The specific topics include:

- the agricultural impact on economics, cultures, social structures, technologies
- agricultural processing, products, and nutrition
- the environmental issues resulting from adding value to agricultural products

Laboratory activities will provide opportunities for

- examining various technologies
- evaluating products
- examining nutritional advantages
- assessing economic benefits to communities
- determining the environmental impact of various developments

Ten Unit—62 Lesson Curriculum

Unit 1: Introduction to Value Added Agriculture—5 lessons
Unit 2: Agricultural Product Utilization—12 lessons
Unit 3: Processing & Manufacturing of Agricultural Products—4 lessons
Unit 4: Social, Economic, & Environmental Impact of Agriculture—5 lessons
Unit 5: Product Development—6 lessons
Unit 6: Market Research—5 lessons
Unit 7: Creating a Business Plan—8 lessons
Unit 8: Producing the Product—5 lessons
Unit 9: Selling Skills—5 lessons
Unit 10: Evaluation—4 lessons

Course Objectives

Students will be able to:

1. Describe the ways and means value can be added to agricultural products.
2. Describe the foundational nature of agriculture to civilization and cultures.
3. Determine the integral nature of agriculture into the Minnesota culture.
4. Describe the flow of agricultural products through the economy.
5. Determine the variety of agricultural products used in everyday living.
6. Evaluate the impact of product and monies generated by agriculture in everyday business.
7. Assess the social and economic advantages of adding value to rural and urban communities.
8. Evaluate the factors in entrepreneurship and marketing agriculture products.
9. Describe the scientific and economic processes essential in developing a new product.
10. Determine demands, wants, needs, and nutritional features in product development.
11. Analyze the image of agriculture by the public and the role of value added.
12. Compare the environmental impact of agriculture and agricultural product flows.
13. Determine the process involved in converting raw agricultural materials into finished products.

Contents of the "Course-in-a-Box"

1. Ten notebooks containing 62 lesson plans, performance package for the MN Graduation Standards, FFA-CDE Guidelines, and several detailed examples.
2. University of Minnesota case study on sustainable agriculture
3. Ten programs on videotape
4. Two reference books
5. Soybean Instructional Kit (CD-ROM, video, and teacher's manual)
6. Four supplemental reference packages
7. Crop ID Kit containing 10 samples and instructor's guide
8. Minnesota Commodity Cards
9. Approximately 20 value added product samples
10. All packaged in two reusable plastic tote boxes.

ERIC

Academic Service Learning at Work in Agricultural Education

Poster Abstract

NAERC '99
Research Fresh from Florida

Julie Baggett
Texas A&M University

Rob Terry
Oklahoma State University

INTRODUCTION

Academic service learning integrates service that addresses unmet community need with the academic curriculum. In the Spring of 1998, the Oklahoma Higher Education Partners for Service Learning offered twenty grants in the amount of twelve hundred dollars for instituting an academic service learning component into courses at Oklahoma State University. As a recipient of this grant, the AGED 3103 course, Foundations and Philosophies of Agricultural Education, has been able to provide student experiences with activities not previously available.

Though Agricultural Education has a long history of service to the community, the dedication of funds specifically for this purpose is relatively new. The National and Community Service Act of 1990 was merely a beginning of the millions of dollars targeted toward promoting academic service learning initiatives (Kahne and Westheimer, 1996). Checkoway (1996) contended that these types of activities enable students to serve the community, reflect on their experiences, and learn lessons for the future. Studies have also shown that academic service learning can develop substantive knowledge while developing life-long social responsibility (Checkoway, 1996).

METHODOLOGY

The Oklahoma Higher Education Partners for Service Learning have identified six essential elements of academic service learning. Each of these will be discussed with regard to the project conducted in AGED 3103.

<u>Youth Voice</u>-Students in AGED 3103 began by selecting a commodity (from a list provided) not normally taught in agricultural education classrooms in Oklahoma. They then developed a unit of instruction for the commodity that included four daily lesson plans, activity sheets, power point presentations, and a unit test. Students also chose schools to observe and teach one of the lessons.

<u>Genuine Need for Service</u>-As technology in schools increases and agriculture changes at a record setting pace, the need for this service was two-fold. First, teachers may access all materials developed by AGED 3103 students via the World Wide Web. This access may increase teachers' likelihood to utilize multimedia. Second, students were exposed to an area of agriculture not normally taught, thus re-emphasizing the broad scope of agriculture in our world.

<u>Partnerships</u>-With forty students enrolled in AGED 3103, the need to extend partnerships was immense. Teachers within a forty mile radius of Stillwater were first contacted by letter then phone and asked for their assistance with observations and input as our students taught in their classrooms. Teachers were also invited to attend an informational-social session focusing on the commodity selection and mentorship aspects of the project.

Service and Learning-The service and learning components of this project were reciprocal in nature. AGED 3103 students provided the service of units of instruction for teachers while learning about the life of an agricultural education teacher. Teachers provided the service of mentorship while learning about teaching technologies and diverse agricultural topics. High School students also provided a realistic setting for teaching while learning about OSU and diverse agricultural topics.

Professional Development-AGED 3103 students developed professionally throughout this process through experience gained in a real classroom and relationships developed with teachers in the field.

Reflection-The reflection process consisted of AGED 3103 students writing a paper on the teaching experience in the school. Teachers were also asked to provide written feedback on forms provided and returned by AGED 3103 students. Additionally, teachers were thanked with a travel coffee mug with OSU logo, and students were presented with a certificate suitable for framing at the conclusion of the project.

IMPLICATIONS

Results of the project have been positive. AGED 3103 students expressed appreciation for the opportunity to gain valuable teaching and observation experience. Student comments included, "Overall the experience was very positive and I am really excited about teaching" and "I had a good time and thought that going out and teaching this lesson...will help me prepare for the future." Teachers also expressed enthusiasm for the opportunity to mentor AGED 3103 students and the availability of unique teaching materials via the World Wide Web. Stronger relationships have also been forged between university faculty and teachers in the surrounding area, making future partnerships more feasible.

One consideration for this type of project would include the time required by students to conduct observations and scheduling a time to teach lessons. To assist with the time element required by students, two lab sessions were dedicated to the project. Another consideration is communication with the teachers participating in the project. Though phone calls, letters, and an orientation meeting were used in describing the nature of the project, some teachers were still confused by the focus on commodities rather than traditional production agriculture. Answers to the communication challenge are still being sought.

Despite these challenges, the project has been deemed a success as it resulted in a win-win situation for teachers, pre-service teachers, and secondary students. AGED 3103 students gained valuable teaching experience with real students and the mentorship of a teacher in the field; teachers gained ready to use units on diverse areas of agriculture; and students gained increased knowledge in the broad scope of agriculture in our world today.

ERIC

REFERENCES

Checkoway, B. (1996). Combining service and learning on campus and in the community. Phi Delta Kappan, 77(9), 600-606.

Kahne, J. & Westheimer, J. (1996). In the service of what? The politics of service learning. Phi Delta Kappan, 77(9), 593-599.

Aquaponics in Your Classroom

Poster Abstract

Carol Leah Mueller
University of Arkansas

George W. Wardlow
University of Arkansas

Donald M. Johnson
University of Arkansas

NAERC '99
Research Fresh from Florida

"Aquaponics in Your Classroom" is a highly successful component of the AgriScience Project at the University of Arkansas. The goal of the project is to integrate agricultural education into the science classroom as a way of generating interest in science and agriculture for at-risk students. The development of a low-cost, classroom-size aquaponic unit has made it possible to engage a large number of students in hands-on activities in science using agriculture as the main context area. Math integration has also been achieved through this program.

Commercially available aquaponic units are expensive, approximately $1500.00 or more apiece, and take up a large amount of floor space in a conventional classroom. Because of these drawbacks, the use of an aquaponic unit as a teaching tool has generally been limited to a few agriculture classrooms at the high school level. The development of a unit that occupies a space roughly equal in size to a standard teacher's desk, and costs roughly $350.00, allows its use in a variety of classroom settings.

Beyond the availability of an aquaponic unit that is useable in the classroom, teachers need activities and lesson plans that will integrate the use of the unit into the existing core curriculum. Because of the diversity of age levels and ability levels of the students, lessons needed to be designed with the individual class in mind. In order to achieve the project goal of integrating agricultural education, teachers also needed instruction in how to include the agricultural implications in their lessons.

METHODS

Equipment

The aquaponic unit design evolved from several sources. Commercially developed units for both aquaculture and hydroponics were considered for their strengths and weaknesses. Agriculture and science teachers were consulted during a workshop in the summer of 1996. Finally, in school experiences over the course of the first year led to the final design of the classroom-sized unit. Plans for the refined unit were drawn, a cutting list for the PVC pipe was prepared, and directions for building the unit were written. Throughout the development stage the cost of the materials, availability of materials, and ease of assembly, was balanced to deliver the highest quality product. Two other considerations for the units in this program are safety and portability. The units must fit through doorways, yet assemble and disassemble in a short period of time. Since these units are used by students from kindergarten through high school, safety is of

ERIC

primary importance to the design.

Curriculum Development

Activities for use with the aquaponic units were developed by a variety of methods. A set of simple plant science, physical science, chemistry and mathematics activities were developed by the project staff and included in a packet that is distributed to any teachers expressing an interest in the aquaponic unit. As units are used in various classrooms, teachers are solicited for their suggestions, comments, and ideas for lessons involving the aquaponic unit. The curriculum already in place in the classroom is refined to include aquaponic components. For example, in teaching a lesson about asexual plant reproduction, one teacher used various plant cuttings in the unit to demonstrate that the new plants retained the characteristics of the parent plant. The emphasis in this program that makes it different from other science classrooms is the agricultural link. The classroom discussion that followed the activity included the use and benefits in commercial agriculture in asexual propagation of plants.

The development of a single curriculum that would be applicable to every K-12 classroom would be impossible. The project staff has developed several basic activities with extensions to make them suitable for various grade levels. Individual consultations between teachers and project staff occur on a regular basis. E-mail has become an important method of communication when regular visits to the school are hampered due to distances involved. Additional lesson plans are made available through the project web site and printed materials are supplied for those without web access.

OUTCOMES

The aquaponic unit and curriculum were displayed at several teacher workshops during the first year of development. The response by teachers was encouraging. Most teachers indicated that the units would stimulate student interest in science. Many requests were received by project staff for the unit and lesson plans. Teachers began to build their own aquaponic units. As the demand increased, the AgriScience Project staff initiated a loaner program. Aquaponics units are loaned to local classrooms for a period of one or two semesters. The response to this program has been overwhelming. Project staff members have directly assisted in building seven units during the last one and one half years. These units were funded by the schools, or teacher acquired grants. Three units have been donated from the project for permanent use, two in classrooms and one at the Greenbush Science Center in Kansas. Fourteen aquaponic units are on loan for spring 1999. These units are located up to 200 miles away from the University of Arkansas campus and are in classrooms ranging from second grade through high school. One of the loaned units is in a special education classroom, and one of the units was donated to an alternative program at a high school. Several teachers are on a waiting list to receive units as they become available. Staff members regularly visit classrooms to assist in teaching lessons using the aquaponic unit.

"Aquaponics in Your Classroom" is only a part of the AgriScience project. It is an example of the excitement that can be generated in science classrooms through the integration of agriculture with existing science curriculum. Over two thousand students have been introduced to agricultural concepts through the use of an aquaponic unit in their classroom. More programs need to be developed in the future that generate the high interest in agriculture and science that has been obtained through the aquaponics program.

ERIC

Developing Asynchronous Learning Resources (ALRs) for Introductory Agricultural Engineering Technology Management Education (AETME) College Courses

Poster Abstract

NAERC '99

John D. Harrison
Texas A & M University-Commerce

Rae A. Chapman
Texas A & M University-Commerce

Texas A&M University-Commerce educators concluded Asynchronous Learning Resources (ALRs) models offered an innovative approach to increase the curriculum organization in introductory Agricultural Engineering Technology Management Education (AETME) college courses. Although students fulfilled prerequisite academic studies in biology and mathematics, some students struggled to assimilate principles during application problems within agricultural courses. Recognizing the weakness of students and realizing the increasing demands that graduates face in the competitive public and private industries, the Agricultural department decided to create supplementary instructional material using available computer technology.

The ALR courses will be available as an alternative delivery mechanism to support the growing non-traditional student population who may require convenient supplementary tutoring of principles that were not fully grasped within the illustrations from lectures or reading material. Presenting learners additional training to impart and integrate the hard sciences into the application as professionals remained the primary objective of curriculum designers.

A.J. Turgeon, Agronomist and Director of Educational Technologies College of Agricultural Sciences, Pennsylvania State University influenced the course developers. Turgeon's interactive instructional models seemed to offer ideal approaches for developing an introductory course for the AETME students. The Practicum model will facilitate opportunities for the students to apply the concepts to real work problem solving. Inside the model, the developers plan to integrate the use of extensive graphics to illustrate the engineering standards.

The interactive model embodies an introduction, thought provoking agricultural problem, a lesson, and quiz. The introduction section directs the module's organizational outline, the lesson's content and a thought provoking engineering problem/dilemma. The next portion of the course, the lesson, uses texts and extensive graphics to illustrate the session's specific agricultural or engineering principles. Upon completion of the lesson, students encounter an objective quiz that provides direct feedback their knowledge of the presented concepts.

Evaluation and Impact of an International Agricultural Study Abroad Program

Poster Abstract

Thomas Bruening
Penn State University

Marc Moran
Penn State University

Olga Averianova
Penn State University

NAERC '99 Research Fresh from Florida

Ensuring that our students are global-ready graduates is a goal central to the strategic plans of The Pennsylvania State University and its College of Agricultural Sciences. To help students fulfill this goal, a program was developed to provide the opportunity for students to travel abroad and begin to develop their international skills at Penn State University. This program was funded from the Kellogg College Food System Profession Initiative program and it features a unique study abroad educational model. The essence of the educational model featured sending a group of agriculture students to Moscow to spend a semester studying at Moscow State Agroengineering University (MSAU) together with a Russian cohort group. The attractiveness of this educational model lies in its opportunity to teach and learn in new ways (for most participants). Lecture time was reduced and active learning/teaching activities, such as decision cases, lab and field experiments, field trips, discussion groups, and cooperative learning through cross-cultural learning schemes were featured. Moreover, instructors had a greater opportunity to strengthen the teacher-learner bond during the one-month intensive teaching period. In addition, students learned first-hand about the struggling Russian democratic experiment through direct meaningful experiences.

The project started in January 1999, when nine undergraduate students from Penn State started their spring semester at MSAU. Since the Penn State courses are taught in one-month blocks of time, three American professors each spent one month in Moscow teaching their three-credit courses. From the Russian side, the participants included 10 students and four professors. Penn State students earned 19 credits that were distributed between Russian Language, Agricultural Education Russian History, Communications, Research Methods, Russian/American Seminars, and Leadership in Agriculture.

It was anticipated that the project would have a number of desirable outcomes:
A model for a new minor international degree will emerge as a result of the collaborative partnership. Students and faculty will have a greater understanding of the international dimensions of food systems. Faculty and students will develop new ways of teaching and learning. Active learning will be a desirable goal for more teachers in the future.
More students and faculty will have an opportunity to participate in international activities, learn about other cultures, and have a greater sensitivity to cross-cultural ideas and people.

EVALUATION

At the end of the semester each student was asked to respond to 50 summative evaluation questions to determine the value of the program. These summative evaluations indicated a number of statements where both groups tended to agree on the 5 point Likert scale: (Highly Agree = 5, 4 = Agree, 3 = Uncertain, 2 = Disagree, and 1 = Highly Disagree). Nearly 50 percent of the responses were ranked "agree" or greater. Both groups tended to indicate the program had quality, broadened their ideas, and was a good opportunity to understand another culture. Both groups of students indicated that the experiences made them more receptive to different ideas and ways of seeing the world. Students tended to believe the program increased their interest in studying language, helped them adapt to new situations, and learning was more interesting because of the format used. Both groups indicated that first and second year university students should not be included in the program. Both groups also indicated that the workload in the one-month intensive courses was not too heavy.

There was some tendency for the two groups to disagree on the tolerance developed, whether the instructors were prepared, the problems caused by lack of language skills, and the organization of the program. Penn State students tended to agree that they developed more tolerance, they believed that their lack of Russian language skills was a problem, lessons learned this year will help next years' organizers and learning this semester was easier than in previous years. While the MSAU students tended to agree that they developed tolerance – however, they ranked it slightly lower than did the Penn State students. MSAU students also indicated a tendency to disagree on the lessons learned for next year, if it was easier to learn compared to a "typical semester", and to what extent working and learning with each other was a positive experience.

IMPLICATIONS

As students seek to increase their understanding of cultural and diverse populations, programs like this need to be evaluated for impact. Programs such as this are, time consuming, expensive to create, and difficult to carry out. Therefore, it is of critical importance to evaluate the program to determine impact. Increasingly it is obvious that universities and business are seeking students with more cultural and international experiences because of how they demonstrate awareness and an interested attitude of students. Without evaluations like this it is difficult to determine if students are able to gain the needed benefits outlined in the objectives of the program.

Students ranked nearly half of the summative statements above the "agree" standard. This tended to indicate the positive value that both groups took away from the experience. There were a few areas where the students tended to disagree. Perhaps these tendencies could be cultural and attitudinal and/or based on other personal standards. This ranking could also indicate need for organizational improvement or a need to fix some of the problems inherent in the start of a new program. Much can be learned by looking at comprehensive summative program evaluations. Clearly this was a positive program for these students and the experiences gained will likely be kept for a long time. Furthermore, this experience has the potential to make an important contribution to the cultural development of these students and the people that they interact with in the future.

Mid-Semester Safari: In Search of the Ultimate Student Teaching Experience

Poster Abstract

NAERC '99
Research Fresh from Florida

Billye Foster
University of Arizona

Jack Elliot
University of Arizona

Deep in the darkest reaches of the inner Arizona continent, a small band of seekers forge a path to greater learning in the quest of finding the ultimate student teaching experience . . . . .

HOW IT BEGAN

April 1998 saw the Western Region AAAE Research Meeting flourish in Salt Lake City, Utah. On Thursday afternoon all the registrants enjoyed the regional tours and fellowship—all but four. The Faculty from The University of Arizona spent Thursday afternoon working on a draft of the student teaching experience for Agricultural Education at the U of A. That afternoon not only changed the format of classes, it changed the paradigm of what was possible for students in Arizona.

HOW IT WORKS

Moving all but one of the methodology classes to the fall and creating a team-teaching approach, the U of A student teaching program now begins in the junior year. In the spring of their junior year students take a team-taught course that introduces the basics of FFA, SAE and the complete Arizona curriculum component. Cooperating centers are matched to students in March, followed by a required participation in the state FFA Leadership Conference in June. In August, students spend a week at their cooperating center and return with assigned lessons/units for spring teaching. The fall semester revolves around three methodology courses that address classroom management, lesson plans, micro-teaching and practice teaching in high school class rooms.

Prior to Spring semester students spend another week in the cooperating centers to verify that all materials are in place for student teaching. In the spring students spend three weeks on campus, completing a methods class on laboratory management and a class on vocational philosophy. Student teaching now spans a thirteen-week period, with a weeklong mid-semester seminar.

MID-SEMESTER SAFARI OBJECTIVES

1. Allow student teachers to share their experiences with the group.
2. Critique videotapes of student teachers at their cooperating centers.
3. Provide opportunity for student teachers to teach in environments other than the relative safety of their cooperating center.
4. Introduce student teachers, first hand, to the wide variety of programs in Agricultural Education in Arizona.
5. Provide hands-on interaction with working FFA chapters and their advisors.
6. Discuss options for Agricultural Education graduates, such as extension or industry.

ERIC

The Agenda

Tuesday	Morning	Students meet at Campus Agricultural Center, Tucson Dr. Glen Miller and Dr. Jim Knight address strengths and weaknesses and develop recommendations.
	Noon	Depart with Dr. Jack Elliot and Dr. Billye Foster in van. Road trip to Payson, Arizona is approximately four hours. During this time students watch and critique teaching videos of Aaron Erwin, Irish Mellor and Aaron Ball.
	Late Afternoon	Animal Welfare curriculum presented by Dr. Foster
	Evening	Dinner and volleyball with Payson FFA.
Wednesday	Morning	Observe and teach four classes at Payson High School
	Noon	Lunch and early afternoon discussion with Jim Sprinkle, Gila County Extension Agent.
	Afternoon	Travel to the V-V Ranch (University) for tour at Camp Verde. The hour drive to Camp Verde provides time to view Eylisia Scarlett's video. A two-hour tour hosted by the U of A and introduced students to another resource!
	Evening	Another hour drive to Mingus Union for viewing and critiquing of Scott Schuldberg's tape. Dinner along the way put us in Mingus at 8:30. Students placed in FFA members' homes for the evening.
Thursday	Morning	Observe and teach three classes at Mingus Union High School. This teacher plans retirement in the next two years
	Noon	Travel and view/critique Leslee Kientzler's video. Lunch on the road.
	Afternoon	Arrive at Chino Valley High School at 1:45. Observe one class and spend afternoon critiquing Brian Sepowitz's video and just sharing ideas
	Evening	Dinner and activities planned with Chino Valley FFA. Students staying with Chino Valley FFA members
Friday	Morning	Meet and leave for Bradshaw Mountain High School. Observe class and Woods Industry
	Noon	Lunch at Young's Farm—From Field to Country Store/Enterprise
	Afternoon	Travel to Mayer High School, observe and teach two classes. How to establish public relations workshop
	Evening	Travel home, critiquing videos for Stacia Ely, Monica Redburn, and Travis Zimmerman. Tucson by 6:30!

COSTS/RESOURCES

Expenses absorbed through salary savings from a state Department of Education grant.

Perceptions of Youth toward the Achievement Program in the Florida State Fair Youth Livestock Program

Poster Abstract

NAERC '99

Tracy S. Hoover
University of Florida

Saundra H. Tenbroeck
University of Florida

From a historical perspective youth have competed in livestock shows for several reasons. One aspect deals with the animal agriculture perspective. Youth livestock shows/exhibits give the animal industry an opportunity to showcase superior animals, genetic improvements and recognize superior breeding and production efforts. Youth also benefit from the competition and exhibition associated with youth livestock projects. Many awards and recognition programs in the 4-H and FFA are closely linked to competition and the various leadership opportunities associated with youth livestock programs. Youth livestock shows allow youth to apply the instructional (formal and non-formal) component of animal agriculture. Billings (1980) noted that there is a tremendous advantage associated with competition. Competition is good when it maximizes the acquisition of knowledge and negative when it detracts from learning. Another interesting observation by Billings (1980) is that historically, competition in youth livestock shows results in a few "winners" and many "losers". Smith & Collins (1988) found that 4-H members who dropped out of 4-H in Ohio had a slightly more positive attitude about competition that current 4-H members did. However, overall both current 4-H members and 4-H dropouts had a negative attitude about competition.

During the past several decades the exhibition of market animals in youth livestock shows has become increasingly competitive. Murphy, Norwood & Dubes (1992) cite the correlation between the intensity of competition and the sale price of the top market animals. This phenomenon has tipped the balance from competition in youth livestock shows for an educational/learning experience to a profit-making venture. Which in turn has lead to incidents of unethical and illegal practices.

Each year there are several prominent and highly publicized cases of unethical and illegal practices in youth livestock shows. In 1992, Murphy et al. found evidence of unethical fitting and showing practices in youth/junior livestock shows in Texas. Some examples cited are, use of illegal drugs/chemicals, "altering" genetics, falsifying birth dates, use of custom fitters and physical alterations and abuse. Another concern with youth livestock shows is the lack of association to "real" livestock production industry. This lack of association is most evident with market animals, for practices and procedures used to produce a market animal for a youth livestock show do not match industry practices and procedures. From an educational perspective this can put agents and teachers in a conflict situation when teaching about the industry of animal agriculture. To try to return to the educational emphasis and intent of youth livestock shows, the Florida State Fair eliminated the traditional "auction" program for top market steers and hogs and instituted an Achievement Program in 1998.

The Achievement Program recognizes and rewards youth for exhibiting champion animals and for participation and achievement in an assortment of educational events. Youth have the opportunity to earn achievement points, which are translated into monies proportional to their involvement in these activities (e.g., educational poster, demonstrations, skill-a-thon, written tests, record books, quiz bowls, volunteering to answer questions). Youth also receive achievement points related to their placing in livestock exhibition and showmanship classes. While the auction component was removed youth were rewarded for producing market animals; all market steers and hogs were sold for 33 cents about market price. There are three levels of competition, junior (age 8-11), intermediate (age 12-14), and senior (age 15+). Youth exhibiting animals in the following divisions were eligible to participate in the Achievement Program: market steer, market hog, dairy, breeding beef, sheep, rabbits, poultry and goats.

The point system is unique for each species given the history behind their respective exhibition and end use of the animal (market and breeding). For example, market animals receive points for gain in weight; rabbits on the other hand do not have such a category. Following competition in "point" earning events and animal exhibition the total number of points are tallied for each participant by species. In each species the four individuals with the highest points are rewarded. The champion and 2nd, 3rd and 4th place individual in each species division receives, respectively, a $1000 bond, $750 bond, $500 bond and $250 bond. In addition to receiving these bonds the top four exhibitors have the opportunity to participate in a "Champion of Champion" contest. This Champion of Champions contest is a round robin contest that tests the participant's knowledge and skills in the other specie areas. This means, if you were one of the top 4 winners in the market hog division you have to exhibit knowledge and skills in rabbits, breeding beef, market steer, poultry, sheep, dairy and goats. The Champion of Champions wins a $3000 bond with monetary awards (bonds) given to the next 5 high individuals.

This study sought to describe the profile and perceptions of the 1998 youth livestock exhibitors towards the Achievement program. To compare the differences between the perceptions of youth livestock exhibitors based upon previous state fair participation, and to identify the perceptions of youth that previously participated in the action program toward the achievement program.

The population for the study was all youth livestock exhibitors in the 1998 Florida State Fair (N=337). The researchers developed a one-page survey, which was mailed to all exhibitors after the fair by the state fair livestock office. Three hundred thirty seven surveys were returned and 336 of them were usable. Data were analyzed with Excel, Ask Same, and SPSSpc.

Youth were asked to list the three things they like the best about the achievement program; of the 336 youth responding 40% (N=133) liked the money or the premiums, 28% (N=95) liked the educational/knowledge/opportunity to learn aspect, 24% (N=79) liked the skill-a-thon, 18% (N=59) liked the volunteering component of the program, and 11% (N=37) liked the showmanship/showing component and 7% (N=24) liked the poster component of the program. One of the most interesting outcomes was in the difference between youth who participated in the state fair last year and those who were participating for the first time. Those youth (N=149) who did not participate last year ranked educational/knowledge/opportunity as the thing they most liked and those youth who participated last year (N=180) ranked the money/premiums the highest. Overall, all youth (N=336) ranked increase opportunities to earn more points/money, more organization/directions, more time to complete activities and no written/easier test as the top suggested four changes for 1999. The overall criticisms of the achievement program from those

youth who participated in the auction program last year (market steer and hog) was the inability to earn as much money and that they worked harder in the achievement program this year. The positive perception of youth that previously competed in the auction program that there was more equal distribution of money and they didn't have to find a buyer for their animals.

This study will be replicated in 1999. Additional research will assess how agents and teachers are using the program and related materials to teach youth about the livestock industry.

Program for Rural School and Community Renewal

Poster Abstract

NAERC '99
Research Fresh from Florida

Clark Hanson
South Dakota State University

PURPOSE

Program goals are to bring schools and communities together to consider healthy community development and economic sustainability, and to assist the young to see ways for making a living in their rural hometowns. A community's future depends on the opportunities available to its young citizens. Maintaining a quality of life in rural South Dakota is a focal point. The direction for a local project is determined by the local community.

OUTCOMES

Activities in participating schools include; studying local heritage, developing student - run businesses, looking into evolving agricultural technologies and conducting local economic and sociological research. Successful projects have involved more than just economical development efforts. Projects have been completed which reflect the quality of life to be experienced in small town South Dakota, including the feasibility of earning a living.

STUDENT EXTRAVAGANZA

The State of Nebraska, which conducts a similar program, and South Dakota sponsors an annual conference which is student planned with presentations made by students from schools with successful projects. This past April, schools from across the country with similar programs, were invited to the April conference.

FUNDING

The program is funded from two private foundations: the W.K. Kellogg Foundation and the Annenberg Foundation's Rural Challenge program. South Dakota State University administers the program with technical assistance from the Black Hills Special Services Cooperative. School Districts and their respective communities have received suitable grants to implement the purposes of the program. Teachers have applied for and received mini-grants to develop learning activities consistent with program goals.

SITES

A wide range of schools participated during the 1998-1999 school year; Agar, Beadle and Spink Enterprise Community (BASEC), Belle Fourche, Deuel, Elm Valley, Estelline, Henry, Howard, Polka, Outland, Shelby, Shannon County, Spearfish, Sioux Valley, Wessington Springs and Willow Lake.

FURTHER INFORMATION

For additional information contact: Program for Rural School and Community Renewal, Box 507, 103 Wenona Hall, South Dakota State University, Brookings, SD 57007-0095. The Program web site is http://www.sdstate.edu/wedl/http/index.html.

ERIC Full Text Provided by ERIC

Recruitment: Taking the Next Step

Poster Abstract

Michael K. Swan
Washington State University

Marvin Kleene
Washington State University

NAERC '99
Research Fresh from Florida

This handbook is designed as a tool that guides the educator through the process of Agricultural Education student recruitment. Its purpose is to give those in the field a grasp of the basic aspects and issues involved in Agricultural Education teacher recruitment. The authors made an effort to be sensitive to the needs of diverse institutions and school districts whose teachers work with a variety of students. Therefore, you will find examples appropriate to the needs of large and small school districts as well as universities and community colleges. You will find material appropriate for professional Agricultural Education student recruitment by teachers, faculty, and peer or paraprofessionals.

If you are new to recruitment, you may have to deal with the practical aspects before the theoretical. We suggest that you first review the pages and activities that are appropriate to your teaching area. Review all the materials and then select those ideas and concepts that you are familiar with first. A quality recruitment program is built on a strong foundation.

Washington State University Agricultural Education faculty strongly supports the concept of developmental recruitment, the necessity of continuous inservice activities for teachers, and rigorous evaluation of recruitment. Recruiting is a professional activity comparable to the other academic activities of teaching, and advising.

Many recruitment programs falter at the outset because of unclear role expectations, especially for faculty/teachers. The recruiter's role needs to be understood clearly, not only from what might be stated in a job description, but also in the context of the overall recruitment program in the institution or school district.

The content in this manual addresses basic issues that recruiters will have to deal with in developing and maintaining recruitment programs. Because of the complexity of the topic, each section includes activities that will assist in developing your recruiting skills and your ability to work with a variety of populations. In addition, a videotape addressing Agricultural Education recruitment at Washington State University is being included. A unit lesson plan to assist in utilizing this tape is included in section three of this handbook.

The loose-leaf format of the handbook was chosen to allow you to add your own examples and activities at appropriate places and to allow us to issue periodic updates and samples of handouts.

The individual materials within the five sections have been kept brief for easy use and reference. Most concepts and ideas contain supplementary activities and examples following the text.

Section One deals with recruitment of students into the field of Agricultural Education teaching at Washington State University. Activities are designed to be accomplished as a partnership among secondary Agricultural Education teachers, Washington State University faculty in Agricultural Education and the Office of the Superintendent of Public Instruction. The ideas, concepts and

ERIC

activities take a team effort to accomplish.

Section Two deals with recruitment of students into the secondary and post secondary programs of Agricultural Education. These activities area also designed as partnership activities between secondary and post secondary Agricultural Education teachers and faculty. Our hope is that these Agricultural Education students will continue on in the field of agriculture at the university level. Again, these materials are designed to be a team effort among teachers at all levels.

Section Three is a phone number list and a web site list of the most important Washington State University contacts. These phone numbers will be updated on an annual basis or more often if necessary.

Section Four is information concerning the Next Step CD-ROM that has been included in this notebook. It outlines what is included in each file folder and key points for using in your classrooms.

Section Five is a grouping of the most important forms you will need to develop and maintain a quality recruitment program. You may want to copy this and have it in several locations in your school district or campus. The current Washington State University 4-year Agricultural Education plan of study for Agricultural Education Teaching Majors is included These materials will be updated on an annual basis or more often if necessary.

Agricultural Education student recruitment is dependent on each of us as professional educators.

ERIC

Standards-Based Education for Agricultural Literacy

Poster Abstract

James G. Leising
Oklahoma State University

Aimee D. Heald
University of Kentucky

Carl G. Igo
Southwest Texas State University

NAERC '99
Fresh from Florida

SITUATION

Agriculture determines a nation's general welfare and standard of living. Today, nearly 90 percent of the United States population is two or three generations removed from direct contact with food and fiber production. As a result, youth know little about agricultural production, processing, marketing, distribution, regulation, and research.

The National Research Council's Committee on Agricultural Education in Secondary Schools recommended all students should receive some systematic instruction about agriculture. In response, instructional materials were developed to help youth learn about agriculture. The Goals 2000 Program for education calls for standards-driven learning across all grade levels. However, educators and agriculturists have been slow to develop a K-12 systematic curriculum framework for agricultural literacy.

RESPONSE

A Guide to Food and Fiber Systems Literacy represents the culmination of four years developing and testing a curriculum framework for Food and Fiber systems literacy. The guide is composed of a compendium of standards, benchmarks, explanatory narrative, and sample instructional materials for grades K-12. It provides a road map for infusing Food and Fiber Systems knowledge into core academic subjects.

Teachers, curriculum specialists, school administrators, and agricultural industry professionals were involved in the development of this guide. Initial work was completed at the University of California, Davis. Further development of the standards and benchmarks was completed at elementary and middle schools during the 1997-1998 academic year in California, Montana, Oklahoma, and Pennsylvania. Overwhelmingly, test results revealed instruction linked to the standards and benchmarks positively impacted student knowledge of Food and Fiber Systems.

Educators throughout the U.S. are using the guide to direct teaching and learning about agriculture.

ERIC

Using A Guide to Food and Fiber Systems Literacy

This guide incorporates a framework to clearly outline the knowledge and understanding needed to be agriculturally literate. It consists of two sections: the Food and Fiber Systems Literacy Framework and example lessons. The Framework section of the guide includes themes, standards, and grade-grouped benchmarks. The themes and standards describe what a person should understand to be agriculturally literate.

Benchmarks for each standard assist teachers in planning, conducting, and assessing instruction. The benchmarks communicate developmentally appropriate aspects of each standard within each grade grouping. The first part of each benchmark is a minimum cognitive knowledge expectation. The second is a psychomotor or affective expectation.

The example lessons help teachers make Food and Fiber Systems connections. Lessons are organized for grade groupings and core academic subjects. Each activity was adapted from an existing agricultural literacy source and reformatted based on teacher input. Food and Fiber Systems Literacy Standards are referenced in each lesson. Also, the lessons are cross-referenced to core academic standards, as identified by the Mid-Continent Regional Education Laboratory.

The Food and Fiber Systems Literacy framework was not designed to be taught separately in school curricula. Instead, Food and Fiber Systems Literacy standards are infused into core academic subjects by using agricultural applications. The concrete connections to food, clothing, and shelter add relevancy to teaching and learning.

The Framework's benchmarks allow a more comprehensive approach to Food and Fiber Systems literacy assessment. Measurements of student progress are based on the benchmarks. A formal assessment should be completed near the mid-point of each grade grouping (beginning of first, third, and fifth grades, and during the seventh and eleventh grades). This rational allows time for remediation, if needed.

Assessment instruments were developed for the K-1, 2-3, 4-5, and 6-8 grade groupings. In the future, a 9-12 assessment instrument will be developed. The instruments are available at cost from Oklahoma State University's Department of Agricultural Education, Communications, and 4-H Youth Development.

Bringing Food and Fiber to the Classroom

The challenge for educators to infuse Food and Fiber Systems literacy into core academic subjects is recognizing existing connections. To effectively use the Framework, teachers must be familiar with the benchmarks. The Framework is not intended to be stand-alone. The example lessons provided in the publication simply are an illustration of ways food and fiber instruction can be infused into core academics. The best connections occur as teachers become aware of their own interdependence with agriculture and then build student awareness of agriculture's interdependence in their lives.

Distributing *A Guide to Food and Fiber Systems Literacy*

Key agricultural literacy stakeholders in each state have received a copy of the guide. These include chief state school officers, agriculture commissioners, commodity group leaders, Ag in the Classroom coordinators, agricultural education teacher educators, etc. Also, project teachers received a copy of the guide. Additional copies of *A Guide to Food and Fiber Systems Literacy* are available from Oklahoma State University's Department of Agricultural Education, Communications, and 4-H Youth Development.

Realizing the growing importance of information technology and the growth of the World Wide Web, *A Guide to Food and Fiber Systems Literacy* is electronically available at

http://food_fiber.okstate.edu. The full publication is posted in Acrobat PDF form for teachers, administrators, and others. Additional instructional materials are available on the web site. Also, the web site provides a forum for project teachers to post ideas and concerns to their peers and the project staff.

Future plans include maintaining the web site, developing instructional materials for grades 9-12, and continued assessment of the standards and benchmarks.

The Last Gasp: Redesigning the Student Teacher Block

Poster Abstract

Julie Baggett
Texas A&M University

Ed Franklin
Oklahoma State University

NAERC '99
Research Fresh from Florida

INTRODUCTION

Each semester, student teachers in Agricultural Education complete four-weeks of on-campus instruction prior to completing their 12-week student teaching internship. Traditionally, enrolling in the student teaching "block" meant a three-hour teaching methods course and several one-credit hour courses in technical agriculture. These technical agriculture courses included swine production and surveying in the fall semester, and sheep production and agricultural electrification in the spring semester. There had been no rationale for those specific courses other than the fact the Departments of Animal Science and Biosystems and Agricultural Engineering were willing to offer one-hour courses in a four-week format.

In exit interviews, student teachers commented that they would prefer not to enroll in the technical block courses, but in many cases were essentially required to enroll to maintain full-time enrollment status. They indicated that they would prefer concentrating on developing their teaching skills as opposed to developing their technical skills. Student teachers also were in agreement that they would like further instruction in teaching specific technical content. They needed a "last-gasp" of technical agriculture, but in a form they could appreciate and use.

In the spring of 1997 Agricultural Education Faculty agreed to modify the instruction student teachers received by adding a one-hour special problems course. The course was broken into four, four-hour blocks of instruction. Topics for the course included computerized record books, building FFA leadership, an FFA update from state staff, and faculty and staff sharing teaching ideas. Based upon positive feedback from student teachers, plans were made to expand to a three-credit hour course in the fall of 1988. The course was re-structured to accommodate students attending a three-hour presentation each day, broken into 16, three-hour blocks of instruction. Ag Ed faculty and staff reserved five of the blocks for Agricultural Education related topics and the other eleven were devoted to technical agriculture. The format was designed to provide a diversity of topics to be covered during a short span of time.

METHODS

In the summer of 1998 teacher education faculty and staff in Agricultural Education met to brainstorm on course topics and University faculty who might be asked to offer instruction in a three-hour block. A graduate teaching assistant met with each presenter to explain the courses' objectives and to schedule the presentation. Presenters were asked to address the following questions: "What do high school agriculture students need to know about your subject" and "how should a student teacher present it." For most presentations student teachers were asked to

ERIC

develop an activity incorporating the material as they see fit into a high school agriculture instructional activity. State Vo-Tech staff were again utilized providing student teachers with the opportunity to gain hand-on skills in completing computerized award & proficiency applications.

OUTCOMES

The new course format was incorporated into the fall 1998 schedule. Twelve student teachers participated in the class that presented fifteen diverse topics (see figure 1.). Thirteen presenters representing nine different academic departments were utilized. A field trip to nearby Langston University allowed students to learn about specialized aquaculture and dairy goat education projects. Data from student course evaluations and presenter surveys have been very positive. Ratings on the majority of topics surveyed scored a mean of 7.71 (on a scale of 1 to 10). Students were asked if each topic should be kept on the schedule. Fifteen of sixteen topics rated very favorably among the class. Low scoring topics are re-evaluated on their content, method of delivery or relevance to the student teaching program and a decision is made to substitute. An unanticipated outcome has been that the four-week teaching methods course (AGED 4103) has been redesigned to be included more instruction in teaching methods. Over the years the course had become a "catch-all" of what student teachers needed to know. The AGED 4990 course absorbed those topics and allowed the course's instructor to concentrate on teaching methods.

FUTURE PLANS

Working cooperatively with Ag Ed State staff at the Oklahoma Vo-Tech, a two-day tour of agriculture education is planned for the fall 1999. Student teachers, OSU Ag Ed staff, and state staff will board vans for a 48-hour road tour of agriculture education programs, vocational technical facilities and specialized agriculture programs within correctional institutions.

645

Day	Topic	Instructor	Location
Tuesday	Resumes/Press Releases	Terry/Weeks	4-H Conference Room
Wednesday	Equine Science	Julie Baggett	Ag Hall 439
Thursday	Aquaculture	Glenn Gebhart	Langston University
Friday	Food Science	Michele Otremba Food Tech Center	Ag Hall 439
Tuesday	Activities in Soil Science	Jeff Hattey Plant & Soil Sciences	TBA
Wednesday	Ag Issues and Policy	Mike Dicks Ag Economics	Ag Hall 439
Thursday	Swine Production	Kim Brock Animal Science	Swine Barn-6th St.
Monday	FFA Update	Kent Boggs, OK Vo-TechWeeks/Terry	4-H/266 AG Hall
Tuesday	Plant Propagation	Doug Needham Horticulture	Teaching Greenhouse
Wednesday	Photography	Shelly Sitton Ag Communications	Ag Hall 439
Thursday	Beef Production	Cindy Pribel Animal Science	Purebred Beef Center
Friday	Record Books	Lee Wilcox, OK Vo-Tech	Vo-Tech Computer lab
Tuesday	Sheep Production	Bill Crutcher Animal Science	4-H Conference Rm
Wednesday	Science Apps in Agriculture	Chris Moseley College of Education	012 Willard
Thursday	Best Practices	AGED Faculty & Staff	4-H Conference Rm

Figure 1. Fall 1998 AGED 4990 teaching matrix

ERIC

CE 079 44(

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

ERIC®

REPRODUCTION RELEASE

(Specific Document)

I. DOCUMENT IDENTIFICATION:

Title: Proceedings of the 26th Annual National Agricultural Education Research Conference	
Author(s): Ricky Telg and Tracy Irani	
Corporate Source: University of Florida	Publication Date: November 1999

II. REPRODUCTION RELEASE:

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, *Resources in Education* (RIE), are usually made available to users in microfiche, reproduced paper copy, and electronic media, and sold through the ERIC Document Reproduction Service (EDRS). Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce and disseminate the identified document, please CHECK ONE of the following three options and sign at the bottom of the page.

The sample sticker shown below will be affixed to all Level 1 documents	The sample sticker shown below will be affixed to all Level 2A documents	The sample sticker shown below will be affixed to all Level 2B documents
PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY Sample TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) 1	PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY Sample TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) 2A	PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY Sample TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) 2B
Level 1 [X]	Level 2A [ ]	Level 2B [ ]
Check here for Level 1 release, permitting reproduction and dissemination in microfiche or other ERIC archival media (e.g., electronic) *and* paper copy.	Check here for Level 2A release, permitting reproduction and dissemination in microfiche and in electronic media for ERIC archival collection subscribers only	Check here for Level 2B release, permitting reproduction and dissemination in microfiche only

Documents will be processed as indicated provided reproduction quality permits.
If permission to reproduce is granted, but no box is checked, documents will be processed at Level 1.

I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce and disseminate this document as indicated above. Reproduction from the ERIC microfiche or electronic media by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries.

Sign here, → please

Signature: Ricky W. Telg	Printed Name/Position/Title: Ricky Telg, Assistant Professor	
Organization/Address: University of Florida PO Box 110540 Gainesville, FL 32611	Telephone: 352-392-0502	FAX: 352-392-9585
	E-Mail Address: rtelg@gnv.ifas.ufl.edu	Date: 12/8/99

(over)